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Mastitis: An overview

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Introduction

Mastitis is an inflammation of the mammary gland caused by bacteria, virus and fungal infection. It is one of the most prevalent and costly diseases affecting the dairy industry, as it reduces milk production, affects milk quality, and increases culling rates. Bovine mastitis is caused by bacterial infections, which can be either contagious or environmental in origin. Contagious mastitis is primarily caused by the bacteria *Staphylococcus aureus* and *Streptococcus agalactiae*, while environmental mastitis is caused by a range of environmental bacteria, including *Escherichia coli*, *Klebsiella* spp., and *Streptococcus uberis*.

Factors causing mastitis

Poor sanitation and hygiene contribute for 67.86 percent, leading the mastitis-causing bacteria to flare up. Mastitis is also affected by age, breed, parity, lactation stage, milking pace, udder and teat morphology. The odds of subclinical mastitis in crossbred cows are highest in animals with a pendulous udder, followed by goat type, imbalanced, trough-shaped, and round udder (Kamboj et al., 2008). Mastitis is more common in small teat-sized animals than in

medium or large teat-sized animals because a shorter teat canal allows microorganisms to travel upward more easily than a large teat canal. Mastitis is more common in pendulous-shaped udders of Sahiwal and Murrah buffaloes (Prasad et al., 2010) than in other udder shapes (Danish et al., 2018). Conical teats are more prone to mastitis in crossbred cows than other shapes such as cylindrical and bottle-shaped teats (Kamboj et al., 2008). Furthermore, the animals are more susceptible to mastitis during the first three weeks of the dry period and the first month of lactation.

Diagnosis of mastitis

Mastitis describes its effect in the form of chemical, physical, and bacteriological changes in milk and pathological changes in glandular tissue.

- In milking parlours, the strip cup test is commonly used to detect clinical mastitis. Squeezing foremilk onto the strip reveals blood, flakes, clots, and milk wateriness, all of which indicate mastitis.
- The California mastitis test is a rapid and simple screening test that estimates an increase in somatic cells in milk during mastitis. Milk samples are often rated as 0, 1, 2, or 3 based on gel formation. A larger somatic cell count and infection level indicates more gel formation.
- The Wisconsin mastitis test, a laboratory test that is mostly performed on bulk tank milk samples. It, like CMT, is used to predict the average number of somatic cells in milk.
- In milk, a modified white side test detects an elevated leukocytic count. Normal milk yields flakes in the test, whereas mastitic milk produces an opaque fluid.
- The pH Determination test measures the acidity of a milk sample. Mastitis produces alkaline milk during late lactation and the dry period, which can be detected with the test.
- A spike in chloride levels in mastitic milk is detected by the chloride test.
- The electrical conductivity test is a physical method for identifying mastitis. The electrical conductivity of a certain milk sample is measured in milli Siemens per centimetre (mS/cm). An electrical conductivity meter (milk checker or digital mastitis detector) is used to do the test; EC levels rise in mastitis due to an increase in Na+ and Cl- concentrations in the milk.
- Milk somatic cell counts are classified into three types: direct microscopic somatic cell count (DMSCC), bulk milk somatic cell count (BMSCC), and individual cow somatic cell count (ICSCC). Somatic cell counts larger than 250000/ml were

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thought to be indicative of inflammation, whereas values less than 100,000/ml were thought to be indicative of normal udder, and counts greater than 500,000 cells/ml were thought to be indicative of infection.

- The N-acetyl-D-glucosaminidase test (NAGASE) measures the amount of the cell-associated enzyme N-acetyl-D-glucosaminidase in milk. NAGASE activity ranges for normal milk (0.5 x 104 cells/ml) and mastitic milk (1.5 x 104 cells/ml) are 0.0053 and 0.034/mole/min/ml, respectively.
- The MBRT calculates the chemical reaction of bacteria's respiratory activity in milk. When all of the oxygen in milk is consumed by bacteria, the blue colour fades to white.
- The milk antitrypsin assay (MAUM TEST) detects increased permeability by measuring milk antitrypsin activity caused by blood á-1 Protease inhibitor seeping into milk. Regular milk contains a trypsin inhibitor (200 BEN units/mL). During mastitis, the level of trypsin inhibitor in milk rises.

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