Mastitis is an inflammation of the mammary gland (udder) that causes a chemical and physical reaction in milk produced by goats. Diagnosis of mastitis is based on signs and history of the herd. A microbiologic milk culture, a Somatic Cell Count (SCC), or an Enzyme-Linked ImmunoSorbent Assay (ELISA) test are used to diagnose infection. The SCC and the California Mastitis Test (CMT) are the most common tests used to diagnose mastitis in dairy goats. The Modified California Mastitis Test (MCMT) was found to be most convenient and easy for diagnosis of mastitis. The sometic cell count was found to be confirmatory test for clinical and subclinical mastitis in goats. The somatic cell count value in mastitis ranged from $37.64-79.60 \times 10^5$ cells per ml of milk. On bacteriological examination, overall 78 samples were cultured out of which 69 (88.46%) samples of which were found to be positive for mastitis. The bacterial load, i.e., aerobic plate count was found to be $9.0-30.8 \times 10^3$ CFU/ml of milk which get reduced to $3.1-17.5 \times 10^3$ CFU/ml of milk after treatment. Coliform count were found to be $2.1-8.7 \times 10^3$ CFU/ml of milk which get reduced to $0.3-3.8 \times 10^3$ CFU/ml of milk after treatment.

**Keywords:** Caprine mastitis, SCC, MCMT, Coliform count

**INTRODUCTION**

Mastitis is an inflammation of the mammary gland (udder) that causes a chemical and physical reaction in milk produced by goats (Radostits et al., 2000). It is more frequent in dairy and meat goats raised under intensive and semi-intensive management practices. It can be manifested in two forms: subclinical form and clinical and may be acute or chronic.

Clinical mastitis (that which is observable) is characterized by visible abnormalities in the udder or milk. These may vary greatly in severity during the course of the disease. Clinical cases can be defined as subacute (mildly clinical) when symptoms include only minor alterations in the milk and the affected quarter such as clots, flakes, or disclored secretion. The quarter may also be slightly swollen and tender. Acute mastitis cases are characterized by sudden onset, pain, heat, swelling, redness and reduced as well as altered milk secretion from affected halves. Abnormal secretion in the form of clots, flakes, or watery...
milk is the clinical sign most consistently observed (Shearer and Harris, 1992).

Diagnosis of mastitis is based on signs and history of the herd. A microbiologic milk culture, a Somatic Cell Count (SCC), or an Enzyme-Linked ImmunoSorbent Assay (ELISA) test are used to diagnose infection. However, the microbiological culture is the most reliable source of diagnosis of mastitis of goats. Research data suggest that microbiologic culture of a single milk sample is reliable for detection of causal agent of the infection (Radostits et al., 2000).

The SCC and the California Mastitis Test (CMT) are the most common tests used to diagnose mastitis in dairy goats. However, research has shown a lower significant relationship between the SCC and mastitis in goats. The CMT is used to detect subclinical mastitis. The test is based on the reaction between the CMT reagent and the DNA genetic material of the somatic cells. A higher concentration in somatic cells leads to a higher CMT score. CMT scores are directly related to average somatic cell counts (Leite-Browning, 2008).

**MATERIALS AND METHODS**

**Sources of Animals**

The present investigation was conducted at livestock farm, Adhartal and private goat keepers in the nearby areas of Jabalpur. A total of 220 lactating goats belonging to non descript, Jamnapari, Barbari and Sirohi breeds were screened (Table 1).

**Epidemiological Studies**

Epidemiology of mastitis in goats were studied at the organized/unorganized farms taking different parameters, about individual animals, recorded such as breed, age, lactation number, stage of lactation, seasons, flock size and number of halves affected. Clinical parameters viz., rectal temperature, heart rate, respiration rate and pulse rate, palpation and inspection of udder for the detection of abnormalities viz., inflammatory swelling, fibrosis of mammary tissue, if any will also be record.

**Testing of Milk Samples**

**Modified California Mastitis Test (MCMT):** The MCMT was performed as per the method described by Devi (1989). The reagent was prepared by adding 2 ml. Stock solution B (bromocresol purple reagent) to make volume 100 ml by adding remaining volume of Stock-solution A (Sodium lauryl sulphate reagent).

Equal quantity of milk and MCMT reagent was added in a mastitis paddle, giving gentle swirling motion in a horizontal plane with minimum agitation did mixing of the contents. In negative cases, the mixture remains liquefied. Grading of the test of positive samples was done according

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Location of Animal</th>
<th>No. of Animals Screened</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>LSF, Adhartal</td>
<td>17</td>
<td>ND</td>
</tr>
<tr>
<td>2.</td>
<td>Amanala</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Sadar</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>Madar tekri</td>
<td>28</td>
<td>17</td>
</tr>
<tr>
<td>6.</td>
<td>Bhedaghat</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>7.</td>
<td>Hanumantal</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>8.</td>
<td>Belkheda</td>
<td>38</td>
<td>23</td>
</tr>
<tr>
<td>9.</td>
<td>Garha</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>10.</td>
<td>Patan</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>117</td>
<td>53</td>
</tr>
</tbody>
</table>

Note: ND – Non Descript; J – Jamnapari; S – Sirohi; B – Barberi.
to the intensity of viscous and gel formation, reflecting the degree of inflammation and leukocyte count. It was scored as trace, 1+ and 3+ reaction depending on the amount of gel formation.

Somatic Cell Count: The procedure for SCC was adopted as per method by Shukla (1980). The leukocyte count in the mastitic milk was made to assess the degree of infection in the respective halves. The CMT positive milk (showing flakes or change in consistency) samples were collected in sterile small glass vials. The name or number of goat and halves from which the sample(s) collected was labeled on vials. For this purpose the right half and left half of animals were designated as RH and LH, respectively. The milk sample collected in vials were transported on ice to the laboratory at Collage of Veterinary Science and Animal Husbandry, Jabalpur for further examination.

Bacterial Count: In the present study, Total viable count and total coliform count of the CMT positive milk samples were determined according to the methods described by Koshy and Padmanaban (1989) and Sarker et al. (1996) with minor modifications.

RESULTS AND DISCUSSION

Modified California Mastitis Test (MCMT)

In present study, a total of 220 does were screened for mastitis; out of which 78 (35.55%) does were found to be positive as evident by formation of gel or viscous mass on CMT paddle. MCMT score of +1, +2 and +3 was noticed as 13.20%, 37.73% and 49.05% of quarter respectively in does affected with mastitis (Table 2).

In the present study for detection of SCM, Modified California Mastitis Test (MCMT) was employed being simple, cheap, quicker, also having the reliability and applicability under field condition as also advocated by Bawaskar (2000) and Abdel-Redy and Sayed (2008). However less efficacy of MCMT was reported by Contreras (1996), Bhujwal et al. (1996), Kurundkar (2003) and Gebrewahid (2012).

On the basis of the result of CMT, SCC and Bacterial count the infected goats were subjected to various treatments. The result of the curative therapy was judged by retesting the milk sample after 7 days. Thirty goats were included in the study were divided into 5 groups comprising of 6 animals. They are named as G1, G2, G3, G4.

Somatic Cell Count (SCC): The milk sample positive for mastitis by MCMT were further proceeded for SCC. The pre- treatment and post-treatment SCC/ml of milk samples were recorded in all the does of different groups selected for therapeutic regime (Table 3).

| Table 2: MCMT Grading in Mastitis |
|-------------------|------------------|-----------------|
| Score             | No. of Positive Quarters for Mastitis (n = 106) | Percentage |
| +1                | 14               | 13.20          |
| +2                | 40               | 37.73          |
| +3                | 52               | 49.05          |

Somatic cell count is an accepted quantitative index for mastitis and is used to evaluate the quality of milk and to predict the udder infection. During the present investigation the mean milk value of apparently healthy does was 8.20 ± 0.47 x 10^5 cells/ml. There was a significant increase (54.7 ± 5.06 x 10^5 cells/ml) in the mean value of SCC in the animals affected with mastitis. These observations tally with the reports of Muley (2003) and Nava et al. (2008) who have observed an increase in SCC value of mastitic milk.
Bacterial Examination of Milk Samples: Out of 78 samples cultured bacteriologically 69 (88.46%) yielded bacterial growth. Nine samples were found bacteriologically negative. These findings are in close agreement with Dadhich et al. (2002) who have isolated 90.90% pathogens from milk samples. However, these findings are differ with the finding of Karthick and Ramprabhu (2007) Who have found that uninfected milk samples may have 67.4% bacteria.

In the present study, Total Viable Count and Coliform Count had been done to determine the bacterial load in mastitic milk.

Total Viable Count (TVC): The pre and post treatment TVC values of goats of group G1, G2, G3 and G4 have been recorded (Table 4).

Coliform Count (CC): The pre and post treatment Coliform count values of goats of group G1, G2, G3 and G4 have been recorded (Table 5).
CONCLUSION

From the findings of the present study it can be concluded that MCMT is the best, most sensitive and easy test for detection of mastitis. The somatic cell count, Total Viable count and Coliform count were found to be equally and reliable diagnostic test for the confirmatory diagnosis of mastitis.

REFERENCES


