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Prevalence of bovine subclinical mastitis in Sirohi district of Rajasthan

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Abstract
The current study was done from July 2020 to December 2020. As unlikely in the clinical mastitis, in sub clinical mastitis there is neither visual abnormality in milk nor in mammary gland. Therefore, knowledge of routine physical examination of udder and diagnostic screening tests for early detection of mastitis and proper treatment of affected animal is one of the paramount importance in order to minimized losses encountered due to sub clinical as well as clinical mastitis. This study was undertaken to evaluate the prevalence of subclinical mastitis in apparently healthy Bovine of Sirohi District. The prevalence of subclinical mastitis in Bovine of Sirohi District was 37% out of 200 dairy cows and buffaloes tested in four division of Sirohi District. In addition, results of the Somatic Cell Count (SCC) showed that the prevalence of subclinical mastitis was significantly high in dairy cow 48.00% followed by 28.00% in dairy buffaloes.

Keywords: Sub clinical mastitis, dairy cows, Buffaloes, SCC, Sirohi District

Introduction
India is having the 192.49 million cattle and 109.85 million buffaloes in the country. (20th Livestock Census, 2019) [8]. On the other hand, the quality of milk produced is not up to the international standards in terms of its constituents, keeping quality and nutritional value. Several factors including poor quality housing, inadequate nutrition, inapt manage mental practices and intra- mammary infections (mastitis) are largely responsible to produce low-quality milk. Due to strategic progress in the animal husbandry practices the housing, nutrition and management have been improved to remarkable level to ensure good quality milk production but we are not yet completely successful in addressing the issues related to infections of mammary gland. In recent days lots of strategies like improved herd sanitation, antibiotic therapy and vaccination are being made to deal with mastitis and a large amount of money is being spent on the research in these areas. Bovine mastitis is the single most important factor contributing to the economic losses to the dairy industry, resulting in reduction in milk yield and quality of the milk. Mastitis is one of the most prevalent diseases of high yielding dairy animals. It is of great economic importance to the dairy industry.
In India, subclinical mastitis was found more, varying from 10–50% in cattle and 5–20% in buffaloes than clinical mastitis. (Lakshmi and Jayavardhanan, 2016) [7] The incidences were highest in purebred Holsteins and Jerseys cows and lowest in local cattle and buffaloes. The factors like herd size, agro climatic conditions of the region, variations in socio-cultural practices, milk marketing, literacy level of the animal owner, system of feeding and management were found important factors affecting the incidence of subclinical mastitis (Joshi and Gokhale, 2006) [5]. Sub-clinical mastitis is 3- 4 times more common than the clinical mastitis and causes the greatest overall losses in most dairy herds (Varshney and Naresh, 2004) [13].
Sub-clinical mastitis remains to be an obscure and latent form of this disease that poses more serious economic concern to the dairy livestock sector, as the incidence is much higher in a dairy herd than the clinical one. The cost of subclinical mastitis is exceedingly difficult to quantify, but most experts agree that subclinical mastitis costs the average dairy farmer more than does clinical mastitis.

Materials and Methods
Sirohi District, which is one of the Backward District in Rajasthan but adjoining to productive state Gujarat have good quality of bovine in district and supply milk to various dairy in adjoining District. About two hundred random milk samples will be collected under aseptic conditions from domesticated dairy Cattle and buffaloes from organized and unorganized dairy

farms of four different tehsil of Sirohi district of Southern Rajasthan. Animal was physically examined thoroughly, and the udder was palpated for any gross inflammatory changes like texture, temperature, and pain. Milk samples were collected following standard aseptic procedures. The udder was washed with clean water and wiped with clean and dry cloth or tissue paper. Teats and hands were disinfected with alcohol and the milk was collected in sterile tubes after discarding the first few stripping. The samples will be transported to the laboratory on ice for further processing. The screening for SCM will be conducted by modified California mastitis test (Kandeel *et al.,* 2018) [6] and Somatic cell count (Singh and Ludri, 2000) Details of the milk samples collected are presented in Table 1.

Table 1: Details of the milk samples collected.

Area	Sub clinical mastitis		
	No. of Samples	Cattle	Buffalo
Sirohi	50	25	25
Revdar	50	25	25
Sheoganj	50	25	25
Pindwara	50	25	25
Total	200	100	100

California Mastitis Test (CMT)

The CMT was performed and interpreted as described by Kandeel *et al.,* (2018) [6]. Briefy, 2 mL of fresh foremilk sample from each quarter was placed in the appropriate chamber of the CMT plastic paddle and mixed with 2 mL of CMT reagent at ambient temperature by gently moving the paddle in a circular motion. A change in viscosity indicated an increase in quarter SCC, with the CMT reaction being visually scored at 45 seconds after adding the reagent. A 5-point scale was used to measure the score of viscosity as follows: negative, mixture remains liquid with no evidence of formation of precipitate; trace, a slight precipitate evident which tends to disappear with continued movement of the paddle; CMT +, a distinct precipitate but no tendency toward gel formation; CMT ++, the mixture thickens immediately with some gel formation, and with motion, the mixtures tend to move in toward the center leaving the bottom of the outer edge of the cup exposed, and out again covering the bottom of the cup if the motion stopped; CMT +++, a distinct gel forms which tends to adhere to the bottom of the paddle and a distinct central peak forms during swirling.

Screening for Subclinical Mastitis by Estimation of Somatic Cell Count

The udders were tested for mastitis using Modified California Mastitis Test (CMT) and only those milk samples which were found negative for mastitis were used in the study. Somatic cell count was measured microscopically by the method of Singh and Ludri (2000) and differential cell counting was also carried out to determine the presence of different cell types like lymphocyte, neutrophils, basophils, eosinophil's, and monocytes. Initially, 500 µL of milk sample was mixed with equal quantity of the lysis buffer supplied by the manufacturer. The mixture was mixed gently to lyse the cells. The lysed milk was then aspirated into the cassette and the cassette was then inserted into the Lactoscan (Somatic Cell Counter) and the SCC values were recorded. The SCC value> 5,00,000 cells / mL of milk was taken as criteria to declare the milk / animal as sub clinically mastitic / infected and such milk samples were subjected for cultural examinations.

Results and Discussion

A total of 200 milk samples collected from cows and buffaloes with subclinical mastitis from Sirohi district of Southern Rajasthan were subjected to California Mastitis Test (CMT) for screening for subclinical bovine mastitis. In primary CMT screening test at the farmers doorstep indicated that 90/200 sample were positive for subclinical mastitis.

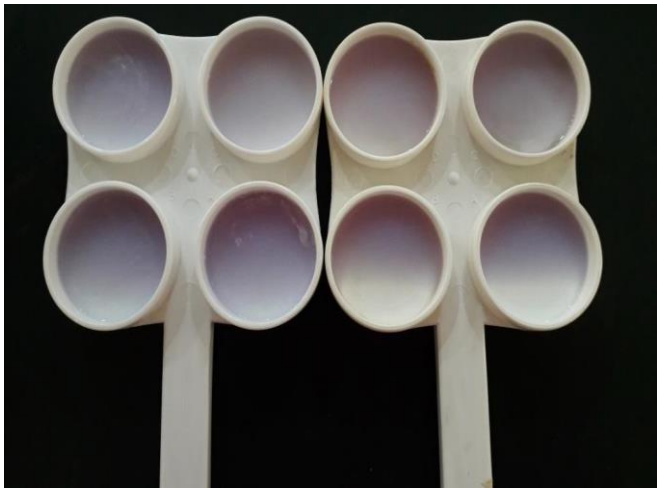

Plate 1: California Mastitis Test of Bovine Milk Sample

Based on the results of SCC, 74 samples revealed SCC >5 lakh cells / mL. A preliminary evaluation of SCC of 200 milk samples indicated SCM at 37% since, 74 out of 200 samples were positive for SCM, if the conventional criteria of SCC >5 lakh cells / mL was considered to declare positivity. These findings agreed with the Hegde *et. al.,* (2013) [3] and Nithinprabhu (2010) [9] who reported 45 per cent and 47 percent SCM respectively in bovine. The similar results were observed by Das *et al.,* (2018) [1] also reported 46.63% (485/1040) of milk samples were having SCC of > 2 X 10 4 cells / ml but no visible clinical signs of mastitis. According to the Javia (2018) 34.29% prevalence of SCM was observed in bovine by measurement of SCC.

Somatic cells are always present in milk, and they increase due to mammary gland infections. When udders are healthy the somatic cell count (SCC) in milk is between 50,000 and 100,000 cells/ml. Skrzypek *et al.,* (2004) [11] and Harmon (2001) [2] reported that SCC is greater than 200,000 cells/ml means; it is assumed to be a threshold distinguishing a healthy udder from a diseased udder.

In present study, the overall prevalence of SCM was lower in buffaloes as compared to the cows. As (48/100) 48% cow milk sample and (26/100) 26% buffalo milk sample were positive for subclinical mastitis. This observation agreed with the findings of Swami *et al.,* (2017) [12] which is 35% cows, and 28.33% buffaloes were found positive suffering from subclinical. This lower prevalence in buffalo as compared to cow might be attributed to the tighter teat sphincter of buffaloes as compared to that of cow.

Table 1: Showing the value of SCC and incidence of subclinical mastitis in bovine.

SCC Value	Buffalo		Cow		Overall	
	No. of sample s (n)	Percentage (%)	No. of samples (n)	Percentage (%)	Total no. of Sample (n)	Percentage (%)
0 - 1 Lakh cell/mL	08	08%	12	12%	24	12%
1 - 2 Lakh cell/mL	14	14%	08	08%	38	19%
2 - 3 Lakh cell/mL	21	21%	14	14%	22	11%
3 - 4 Lakh cell/mL	18	18%	10	10%	20	10%
4 - 5 Lakh cell/mL	13	13%	08	08%	26	13%
> 5 Lakh cell/mL	26	26%	48	48%	74	37%
Total Sample	100		100		200	

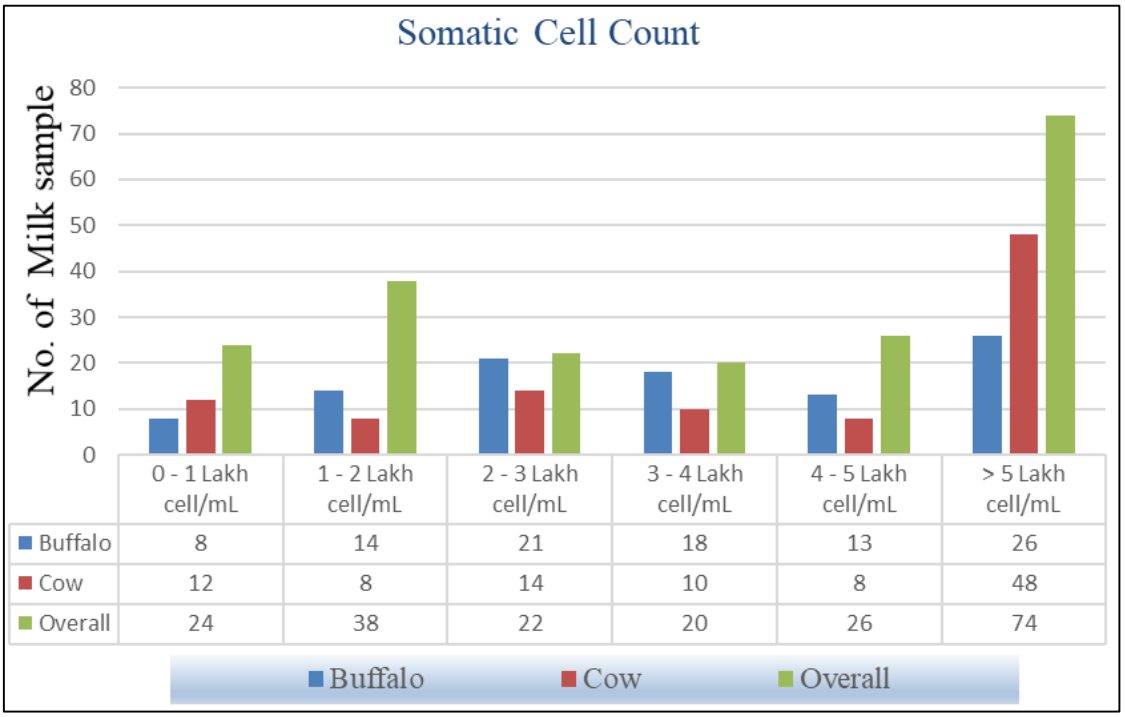

Fig 1: Distribution of milk samples according to SCC value of apparently healthy bovine milk samples

Conclusion

Mastitis, in its clinical and subclinical forms, is considered one of the most devastating diseases that affect dairy herds. In present Study the Prevalence of Subclinical Mastitis is more in dairy cows than Buffaloes which is due to the splinter of teats in Cows which makes them more prone to condition.

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