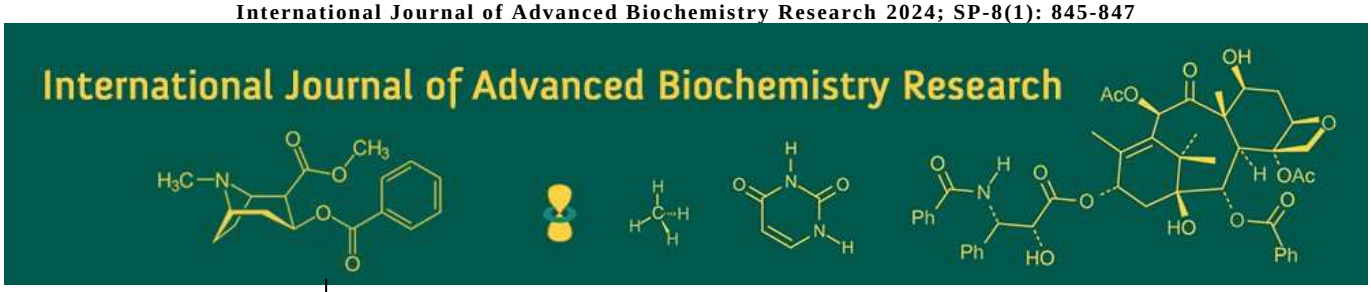

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Studies of prevalence in subclinical mastitis in cattle on basis of cultural and diagnostic test in Bikaner area of Rajasthan

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Abstract
In the present research, containing a total 394 functional quarters of 100 cows were screened for subclinical mastitis on the basis of milk pH test, somatic cell count, electrical conductivity test, Modified california mastitis test (MCMT) and culture examination. The maximum animal wise prevalence of SCM was found in somatic cell count (51%) followed by modified California mastitis test (46%), electrical conductivity (44%), milk pH test (42%) and minimum with culture examination (41%). The highest quarters wise prevalence of SCM was found in somatic cell count (28.42%). Right hind quarters were more affected than the left forequarters in each mastitis detection tests.

Keywords: Cattle, prevalence, SCM (Subclinical mastitis)

Introduction
Mastitis a worldwide problem as it widely adverse effects on animal health, quality of milk and milk production economics and every country including developed ones gone through huge financial losses related to culling, decreased production, decreased fecundity, and treatment costs (Seegers *et al*., 2003) [13]. As it cause huge loss in milk production, the subclinically affected animals remain a constant multiplier of infection to other animals in herd and some risk factors, like age, stage of lactation, lactation number, method of milking and housing increase incidence of subclinical mastitis. (Swami *et al.*, 2017) [16]. Mastitis can defined as inflammation of parenchyma tissue of mammary glands and is characterized by, chemical, physical, and usually bacteriological changes in milk and pathological changes in glandular tissues (Constable, 2017) [3]. Whereas in subclinical mastitis, visible changes are not observed in the udder and appearance of milk but milk production decreases with an increase in somatic cell count and secretion of pathogen in milk (Nithya *et al*., 2017) [7]. Non-observable change in milk in subclinical mastitis can be detected using indirect diagnostic methods including the somatic cell count (SCC), modified California mastitis test (MCMT), milk pH, electrical conductivity (EC) of milk and culture examination. SCM detected using components of inflammation and isolation of pathogens in milk (Rupakala, 2016) [9]. So, the present study was done with aim to detect the prevalence of SCM in cattle in Bikaner area of Rajasthan.

Required Materials and Methods
In this study, 100 apparently healthy lactating cows were screened for subclinical mastitis by somatic cell count (SCC), Modified California mastitis test (MCMT), electrical conductivity (EC), milk pH, and culture examination from organized farm and animals of individual holding in and around the Bikaner (Rajasthan). Collection of all the milk samples were done aseptically using proper antiseptic measures. Teats were washed with Luke warm water then dry and then clean using spirit swab. First, few stripping of foremilk was discarded. About 30 ml of fore milk from each teat collected in a sterile vial. Samples were then kept in refrigeration (4 °C) in laboratory until analyzed. The MCMT is done using method of Schalm and Noorlander (1957) [11]. The principle was based on adding detergent to the milk sample which having high cell count cause lysis of cells and release genetic material and other constituents it causes formation of a gel consistency (Viguier *et al*., 2009) [17].

The somatic cell count of milk samples was done using method described by Schalm *et al.* (1971) [12]. The electric conductivity (EC) is because of its soluble salt fraction. EC of milk samples was measured by Pen type EC035 (ATC) conductivity meter of ERMA instruments. The pH of milk shows status of udder health of the animal milk. The milk pH was calculated using single electrode Pen type digital pH meter PH-035 (ATC) of ERMA Instruments. The milk sample was then streaked on nutrient agar plate and MacConkey (MCA) agar plates in primary, secondary and tertiary pattern in order to obtain isolated colonies of bacteria. These petri dishes were incubated for 24 hours at 37 ºC. After incubation, these isolated colonies were cultured on Edwards's agar plates, Mannitol salt agar (MSA), Eosin methylene blue agar (EMB), Simmon's Citrate agar plates for isolation of *Staphylococcus*, *Streptococcus*, *Klebsiella* and *Escherichia.* respectively and incubated for 24 hours at 37 °C. The pure cultured bacterial isolates were then transferred to nutrient agar slants where they were kept at 4 °C in refrigerator until further evaluation and characterization. The smears were prepared from pure colonies of bacteria and fixed by gentle heating. The smears were stained by Gram's staining. The stained smears were observed under oil immersion for morphological characters and to identify homogeneity of organisms.

Results and Discussion

The Animal wise prevalence of subclinical mastitis of 100 cows, 44 (44%), 42 (42%), 46 (46%), 51 (51%) and 41 (41%) animals was found positive for subclinical mastitis (Table 1 and Fig 1) and the overall quarter wise prevalence of subclinical mastitis of 394 quarters, 105 (26.64%), 97 (24.61%), 102 (25.88%), 112 (28.42%), and 93 (23.60%) (Fig 2) the quarters were found positive for subclinical mastitis based on electrical conductivity, milk pH, modified California mastitis test, somatic cell count and culture examination, respectively. The finding was in accordance to finding of Gupta (2021) [4] who also recorded animal wise prevalence 37.25 percent, 43.72 percent, 41.30 percent, 39.87 percent, respectively. The animal wise prevalence of subclinical mastitis on the basis of CMT was in close approximation to the study of Sharma *et al.* (2012) [14], Ayano *et al.* (2013) [1], Suleiman (2018) [15], Marwaha (2018) [6], Yadav (2018) [18], Constable *et al.* (2019) [2], Kachhawa (2018) [5] and Savita *et al.* (2020) [10] wherein they reported animal wise prevalence as 42.18 percent, 41.02 percent, 33 percent, 38 percent and 38.87 percent, respectively. The Overall quarter wise prevalence of subclinical mastitis of 394 quarters, 105 (26.64%), 97 (24.61%), 102 (25.88%), 112 (28.42%), and 93 (23.60%) quarters were found positive for subclinical mastitis based on electrical conductivity, milk pH, modified California mastitis test, somatic cell count and culture examination, respectively.

Table 1: Animal wise prevalence of SCM in cattle based on various culture examination and diagnostic tests

Diagnostic tests	Cows positive (Out of 100 screened cows)	Prevalence (percent)
Electric Conductivity	44	44
Milk pH	42	42
Modified California mastitis test	46	46
Somatic cell count	51	51
Culture examination	41	41

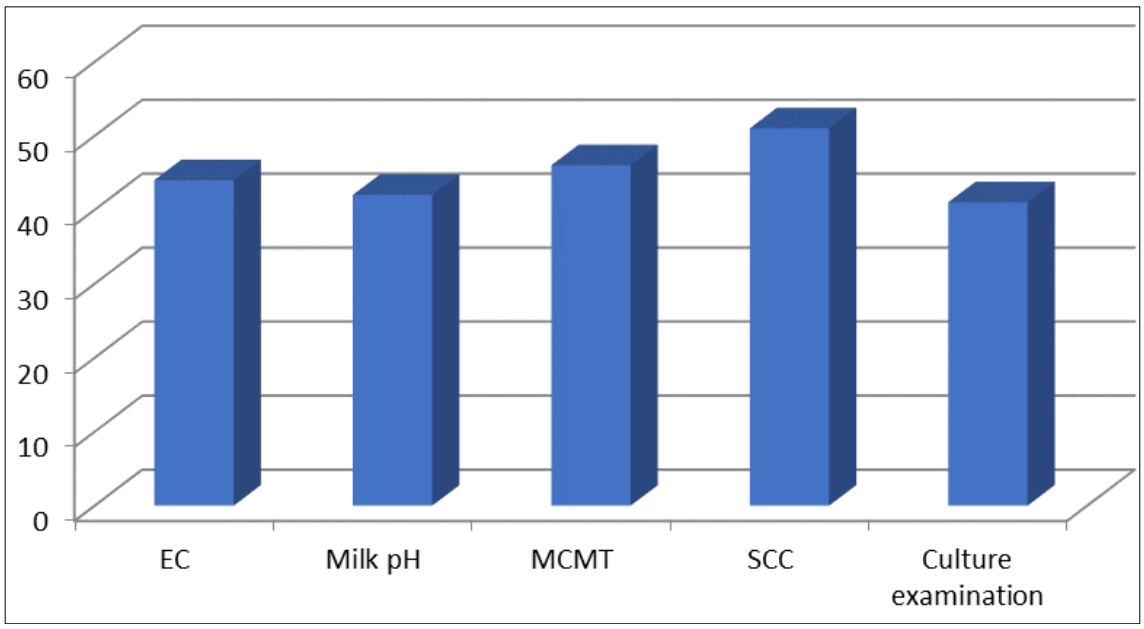

Fig 1: Animal wise prevalence of SCM in cattle based on various diagnostic tests and culture examination

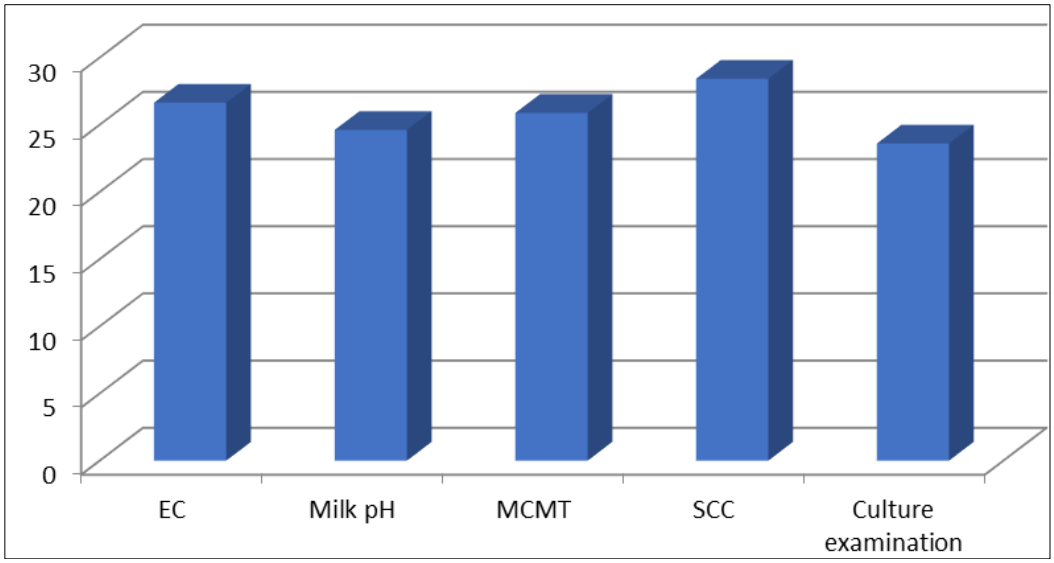

Fig 2: Overall quarter wise prevalence of SCM in cattle based on various diagnostic tests and culture examination

Conclusion

The animal quarter wise highest prevalence of SCM was recorded with somatic cell count method followed by modified California mastitis test, electrical conductivity method, milk pH test and least with culture examination respectively.

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