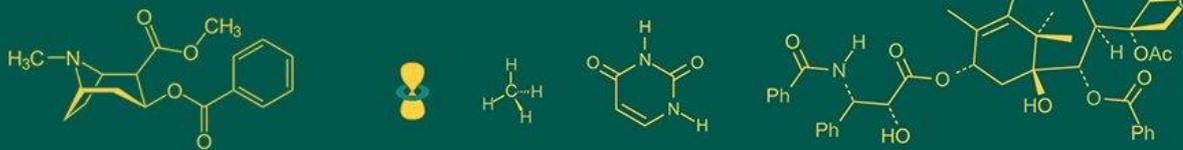


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Determination of sero-prevalence of brucellosis in sheep (*Ovis aries*) in Bikaner district of Rajasthan

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Abstract

Brucellosis occurs worldwide in domestic animals such as cattle (*B. abortus*), sheep (*B. ovis*), sheep and goats (*B. melitensis*), dogs (*B. canis*), pigs (*B. suis*), desert wood rats (*B. neotomae*) and camel due to *B. abortus*. In view of the epidemiology of Brucellosis in India the topic on the prevalence of this disease in the sheep population of Bikaner District of Rajasthan state was carried out. Age-wise and Sex-wise prevalence of Brucellosis carried out along with the overall prevalence of the disease using Indigenous ELISA. A total number of 100 sheep sera samples were screened. The age-wise prevalence was detected as 06.25 percent in less than 6-month age group, 13.15 percent in 6-12 months age group and 19.56 percent in more than 12 months age group. Sex-wise sero-prevalence was detected as 06 percent and 09 percent in male and female sheep respectively. An overall seroprevalence of Brucellosis was found to be 15 percent. The current findings revealed that Brucellosis infections is more prevalent in Bikaner District of Rajasthan.

Keywords: Brucellosis, sero-prevalence, indigenous ELISA

Introduction

Brucellosis is an important zoonotic disease that causes huge economic losses to the livestock owners and is of great public health significance due to the human consumption of unpasteurized milk of infected goats and sheep and their products. Hence, this product becomes the chief cause of infection in human (Wareth *et al.*, 2014) [21]. Brucellosis is recognized as one of the most important zoonotic diseases across the world as it poses a major threat to both human health and animal populations (Cutler and Cutler, 2006; Mensal *et al.*, 2011) [6, 11]. The disease creates a serious economic problem for both the intensive and extensive livestock production systems in tropic. Abortion may lead to retained fetal membranes, metritis and long period of infertility. Infertility in turn increase the period between lactation and inter-calving period may be by several months. Sterility, cull of animals due to breeding failure, endangering animal export trade of a nation, loss of man-hours works and medical costs and governmental cost on research and eradication schemes. The symptoms in infected sheep and goats are abortions, stillbirths and the birth of weak off springs. Animals that abort may retain the placenta. Sheep and goats usually abort only once, but reinvasion of the uterus and shedding of organisms can occur during subsequent pregnancies. The abortions occur in the last trimester of pregnancy, premature births followed by retention of placenta, metritis, decreased milk production and lameness as a common sequel to infection in dairy animals (Megid *et al.*, 2010) [10].

Material and Methods

In present investigation 100 sheep were screened for prevalence of Brucellosis. Serum samples for the present study were collected from veterinary hospitals, local abattoir and farms in Bikaner district of Rajasthan. For these studies, about 10 ml of blood was collected in a test tube without anticoagulant for separation of serum. The serum was separated then serum samples were transferred to sterilized pyrex tubes with help of pasture pipette and were stored at -20 °C till further analysis. The collected serum samples were examined by using Indigenous ELISA kit developed by CIRG, Makhdoom, Mathura.

Results and Discussion

Age related sero-prevalence of Brucellosis in sheep

Sheep sampled for the current study were divided into three age groups (I) Less than 6 month of age, group (II) 6 to 12 month of age and group (III) more than 12 month of age, to determine the possible association of brucellosis with age. Out of 100 sheep sampled for study, 16 were less than 6 months of age, 38 were 6 to 12 month of age and 46 were more than 12 months of age (Table 1).

Analysis of age-related data of brucella positive sheep (n = 15) indicates towards higher sero-prevalence in sheep of age group-III (>12 months) i.e., 19.56 percent (9/46) followed by 13.15 percent (5/38) in group-II (6-12 months) and 06.25 percent in group-I (1/16).

Table 1: Age wise sero-prevalence of brucellosis in sheep

S. No.	Age (Months)	No of positive for brucellosis in each group
1.	<6	06.25 percent (1/16)
2.	6-12	13.15 percent (5/38)
3.	>12	19.56 percent (9/46)

In lamb born from contaminated dams, congenital infections can occur, but their incidence is low. Infection happens in utero, and foetus infection does not usually lead to abortion during pregnancy. Kids and lambs infected can be born alive. It is also possible to get latent infection from the intake of contaminated colostrum and milk, and this may be the explanation for the prevalence of positive reactors in young animals (Constable *et al.*, 2017) [5]. Low seroprevalence in young animals can be clarified on the basis that before their first parturition or abortion, animals may harbour the organism without expressing any detectable antibodies (Shafiq *et al.*, 2019, Mohamud *et al.*, 2020) [19, 9].

In adults, Chandra *et al.* (2005) [3] reported a higher prevalence (1.65 percent) than in young goats (0.58 percent). The vulnerability to brucellosis in adult animals can be attributed to their suitability for breeding. In adulthood, sexual maturity is reached. Different stress factors can also lead to increased animal susceptibility to infection due to the release of naturally occurring corticosteroids, which in nature are highly immunosuppressive (Wadhwa, 2007) [20].

Sex wise sero-prevalence of brucellosis in sheep

Out of 100 sampled sheep there were 59 male and 41 females (Table-2). Out of 15 positive sheep from the studies area, 6.00 percent (6/100) male and 9.00 percent (9/100) female were found positive.

Table 2: Sex wise prevalence of brucellosis in sheep

S.No.	Sex	Prevalence (percent)
1.	Male	6.00 percent (6/100)
2.	Female	9.00 percent (9/100)

Data for male (06 percent) and for female (09 percent) sheep are in agreement to earlier results of Bezabih *et al.*, 2015 and Ali *et al.*, 2017 who found female herds often seropositive. The possible reason might be that positive males are often sold in meat market by the farmers and females are source of chronic infection of the herds.

Overall sero-prevalence of brucellosis in sheep

Out of 100 sheep serum samples collected from the studies

area, 15 percent (15/100) were found positive (Table-3), for brucellosis on the basis of Brulisa test (Brulisa ELISA kit developed by CIRG, Makhdom).

Table 3: Overall sero-prevalence of brucellosis in sheep

S.No.	Disease	Prevalence
1.	Brucellosis	15 percent (15/100)

Thus, several scientists have reported the prevalence of brucellosis in sheep. Finding of present study were in accordance with Safi (2015) [17] and Joshi *et al.* (2019) [7], who also reported brucellosis sero-prevalence (14.80 and 25 percent) in sheep in the Rajasthan district of Bikaner. Reviriegoa *et al.* (2000) [16], Saxena *et al.* (2017) [18] have reported lower prevalence (2013).

The prevalence of brucellosis in the broad range of small ruminants between geographic locations, size of herds and various age groups in India (Rajkhowa *et al.*, 2005; Londhe *et al.*, 2011; Ramesh *et al.*, 2013) [14, 8, 15].

In present study higher prevalence has been recorded as compared to many earlier studies done in India, this might be attributed to differences in management practices followed by individual owners and to the fact that in the present investigation Brulisa ELISA kit has been used which is reported to be highly sensitive and specific. Indirect ELISA can be used for the determination of specific IgG, IgM and IgA brucella antibodies in blood, serum and CSF (Nielsen *et al.*, 1996) [12].

Conclusion

The present results show that infection with brucellosis is prevalent in the district of Bikaner. However, to allow early detection of brucellosis among sheep and other susceptible animal species, the adoption of the year-round surveillance system is important because some livestock owners used to keep different animal species in one flock/herd, which increases the transmission of the disease between species.

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