EVALUATION OF SERO-PREVALENCE OF BRUCELLOSIS IN GOATS

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ABSTRACT

A total of 100 serum samples of goats were evaluated to determine the seroprevalence of brucellosis. The *brucella* reactors were determined by using Brucheck Dot ELISA test. Overall seroprevalence of brucellosis was 22%. The adult goats showed higher sero-prevalence (33.33%) as compared to goats below one year (12.72%) of age group. Susceptibility to brucellosis in adult animals might be attributed to their breeding suitability. The female goats showed higher seroprevalence (22.85%) as compared to male goats (20.00%).

Key words: Goats, brucellosis, seroprevalence, Dot-ELISA

Introduction

The goat has tremendous potential to be projected as the future animal for rural prosperity under the changing agro-climatic conditions and depleting resources. Brucellosis is a world-wide contagious disease of zoonotic importance and of public health significance (Anonymous, 1986; Gerhardt *et al*., 2002). Brucellosis is endemic in India. *Brucella melitensis biotype-1* in sheep, goats and man are pre-dominant infective biotypes. Clinical signs vary according to the animal hosts and the infecting *Brucella* spp. (Megid *et al*., 2010). The disease is characterized by abortion, retention of placenta, decreased milk yield and subsequent high rate of infertility. During last 3-4 decades, brucellosis in small ruminants has gained much attention because of its role in spread of infection to cattle and human beings. All abortions in late gestation in domestic animals should be treated as suspected brucellosis and should be investigated. Sero-prevalence of caprine brucellosis has been reported from different parts of India and abroad. Dubey and Mathur (1980) reported 1.78 % prevalence of brucellosis in sheep and goats in Rajasthan. Shaukat (1985) and Godara (1998) reported incidence of brucellosis to be 3.94 and 18.51 per cent in sheep and goats, respectively by using serum tube agglutination test (STAT).

Brucellosis in human beings cannot be managed without its control and prevention in animals. *Brucella melitensis* requires major consideration as an agent of bio-terrorism and agro terrorism. It is believed that fewer than 10 cfu are capable of infecting humans and infection can occur from aerosol infection. This would require mass therapy of human populations and destruction of animal populations, with associated problems (Radostits *et al.,* 2007). The present investigation was carried out to determine the seroprevalence of disease for further formulation of strategic approach for its prevention and control.

Materials and Methods

A total of 100 blood samples of goats were collected and serum was separated. The *brucella* reactors were determined by using Brucheck Dot ELISA test kit. This dot-ELISA kit detects antibodies to *Brucella melitensis*. Sample antibodies bind to *Brucella melitensis* antigen molecules attached to the nitrocellulose membrane of the spikes of the 12 spiked plastic comb. Binding of these antibodies is detected by reaction with horse radish peroxidase (HRP) labeled affinity-purified antibodies to goat and sheep immunoglobulin. Attached HRP-labelled antibodies are detected by addition of enzyme substrate and visualized by subsequent bluish-brown color product development. Strong colour development indicates the presence of antibody to *Brucella melitensis* in the sample. No colour development indicates the absence of antibody to *Brucella melitensis* in the sample. This test can be used to detect antibodies in serum.

Results and Discussion

Out of 100 serum samples, 22 (22%) were found positive for brucellosis by Dot ELISA test (Table 1 and Fig. 1). Singh *et al*. (1998) used rapid, easy and field-based qualitative dot-enzyme linked immunosorbent assay in the screening of field goats. They found that overall incidence of brucellosis in goats was 4% in seven districts of U.P. and Punjab. In Bikaner region of Rajasthan, Maheswari (2012) reported seroprevalence of brucellosis in goats by using RBPT and STAT as 10% and 6%, respectively. Godara (1998) reported 18.51% and 8% positive samples on STAT in sheep and goats, respectively in Western part of Rajasthan. Teshale *et al.* (2006) reported seroprevalence of brucellosis in sheep and goats in pastoral region of Ethiopia by using RBPT and indirect ELISA as 1.9% and 9.7%, respectively. Maher and Venkataraman (2007) reported overall prevalence of *B. melitensis* infection in goats as tested by RBPT, STAT and indirect ELISA to be 17.68, 16.02 and 24.86%, respectively in different areas of Chennai.

Out of 100 serum samples, 55 samples were from below one year of age group animals and 45 were from adult age group goats. The adult goats showed higher seroprevalence of 33.33% by Dot-Elisa as compared to below one year (12.72%) of age group (Table 2).

Congenital infection may occur in calves born from infected dams but its frequency is low. The infection occurs in uterus. Infection of foetus during pregnancy does not necessarily result in abortion. Infected kids and lambs may born alive. Latent

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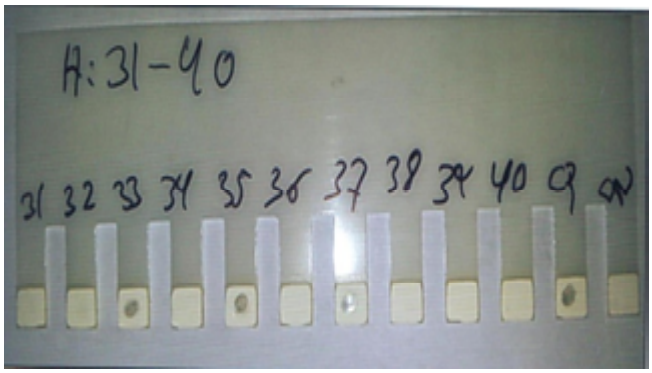

Fig. 1: Dot-ELISA test comb showing positive samples for detection of *Brucella melitensis* in goats

Table 1: Overall seroprevalence of brucellosis in goats

S. No.	Test	Samples tested	Samples positive	Per cent positive
1.	Dot-ELISA	100	22	22

Table 2: Age wise seroprevalence of brucellosis by Dot-ELISA

S. No.	Age	Samples tested	Samples positive	Per cent positive
1.	Below 1 yr	55	07	12.72
2.	Adult	45	15	33.33

Table 3: Sex wise seroprevalence of brucellosis by Dot-ELISA

S. No.	Sex	Samples tested	Samples positive	Per cent positive
1.	Male	30	06	20.00
2.	Female	70	16	22.85

infection can also be acquired from the ingestion of infected colostrum and milk and this may be the reason of presence of positive reactors in young ones (Radostits *et al.,*2000).

Chandra *et al.* (2005) reported higher prevalence in adult (1.65%) than in young goats (0.58%). Susceptibility to brucellosis in adult animals might be attributed to their breeding suitability. Sexual maturity is attained in adult age. Different stress factors may also contribute to increased susceptibility of animal towards infection due to release of naturally occurring corticosteroids which are strongly immunosuppressive in nature (Wadhwa, 2007).

Out of 100 serum samples, 35 samples were from male animals and 65 were from female animals. The female goats showed higher seroprevalence of 24.61% by Dot-ELISA as compared to male goats (11.42%).

Out of 100 serum samples, 30 samples were from male animals and 70 were from female animals. The female goats showed higher seroprevalence (22.85%) as compared to male goats (20.00%) by Dot-ELISA (Table3).

Avinash *et al.* (2014) reported seroprevalence in goats as 7.14% by Dot-ELISA and the prevalence was found to be highest among goats in Karnataka. A total of 252 serum samples were collected from the goats of Karnataka and subjected to 5 different serological tests, i.e. Rose Bengal Plate Test (RBPT), Standard Tube Agglutination Test (STAT), 2-mercaptoethanol test (2-MET), Indirect ELISA (I-ELISA) and Dot-ELISA to detect the Brucella antibodies.Test-wise, the seroprevalence in goats was 5.15% by RBPT, 6.34% by STAT, 1.98% by 2-MET, 9.52% by indirect ELISA and 7.14% by Dot-ELISA. The prevalence of brucellosis was found to be highest among goats of northeast Karnataka followed by northwest Karnataka, central Karnataka and south Karnataka. Indirect ELISA detected maximum number of positive samples. The study used five serological tests to determine the apparent seroprevalence of caprine brucellosis in Karnataka. Taking indirect ELISA as reference, the tests revealed the relative sensitivity values in the following order: Dot-ELISA>STAT>RBPT>2-MET.

Kartik (2015) reported similar findings that overall sero-prevalence of brucellosis by Dot ELISA test was 20%. Out of 100 serum samples 20 (20%) were found positive for brucellosis by Dot ELISA test. The adult goats showed higher sero-prevalence of 30.00% by Dot-ELISA as compared to below one year (13.33%) age group. The female goats showed higher sero-prevalence of 24.61% by Dot-ELISA as compared to male goats (11.42%).

Amit *et al*. (2016) reported that overall seroprevalence of bovine brucellosis by RBPT and STAT was 5.55% and 6.79%, respectively.

The Dot ELISA test is better test for sero-diagnosis of brucellosis in goats in field conditions because it is easy, rapid, highly specific and sensitive test.

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