



Investigation of Bovine, Caprine and Ovine Brucellosis in North Bahri, Sudan

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ABSTRACT:

The study was conducted at Bahri North, Khartoum State, Sudan, during the year 2021. The study was aiming at detection of bovine, caprine and ovine brucellosis in North Bahri. A total of 1050 bovine, 2081 caprine and 870 ovine blood samples were collected. Sera were separated from blood samples and kept at -20° at the laboratory of College of Veterinary Medicine, University of Bahri. Sera were tested using Rose Bengal Plate Test (RBPT) and modified Rose Bengal Plate Test (mRBPT) for detection of Brucella antibodies. By using RBPT for testing the sera for brucellosis, the prevalence of bovine brucellosis was 0.95, caprine brucellosis 11.24% and ovine brucellosis 1.14%. By using mRBPT for testing the sera for brucellosis, the prevalence of bovine brucellosis was 1.42, caprine brucellosis 13.83% and ovine brucellosis 1.95%. mRBPT is more sensitive than RBPT in detection of Brucella antibodies. Investigation of more animals covering the whole state, using of other serological and immunological test and vaccination of animals are recommended.

Keywords: Bovine, Brucellosis, Ovine, Caprine, North Bahri, Sudan

I. INTRODUCTION:

Brucellosis is a zoonosis that exists worldwide and is more or less endemic within most countries of Africa [1]. Brucellosis in domestic animals is a chronic disease that is characterized mainly by reproductive signs in cattle, buffaloes, pigs, sheep, goats and dogs. In females the disease is characterized by abortion, placenta retention, vaginal secretions, low fertility rate and also embryonic and neonatal death. In males, regular findings include epididymitis, orchitis, uni- or bilateral testicular atrophy, sperm abnormalities and infertility. Lymphadenopathy, hepatopathy, splenomegaly, uveitis and discospondylitis may also be observed in dogs. In horses, the typical clinical sign is characterized by a granulomatous supraspinous or supra-atlantal bursa lesion. Infected animals can also be asymptomatic. Infected symptomatic or asymptomatic animals represent an important source of infection to other animals and humans [2]. *Brucella abortus*, responsible for bovine brucellosis, *Brucella melitensis*, the main aetiological agent of ovine and caprine brucellosis and *Brucella suis*, first isolated from swine. These three *Brucella* species may cause abortion in their hosts which results in huge economic losses [3]. *Brucella ovis* produces a disease unique to sheep and is one of the most common causes of epididymitis in rams and a rare cause of infertility and abortion in ewes and neonatal mortality in lambs [4]. Caprine brucellosis is a chronic infectious disease caused by *Brucella melitensis*. Middle- to late-term abortion, stillbirths, and the delivery of weak offspring are the characteristic clinical signs of the disease that is associated with an extensive negative impact in a flock's productivity. *B. melitensis* is also the most virulent *Brucella* species for humans [5]. In Sudan [6] reported 15.75% prevalence rates of brucellosis in cattle in Eldein area in Western Sudan. [7] reported 10.3% prevalence rates of the disease in West Darfur state of Sudan. [8] reported that the prevalence of bovine brucellosis in Kuku Dairy Scheme (Sudan) in Khartoum State was found to be 24.9% based on c-ELISA as a confirmatory test after screening using Rose Bengal Plate test (RBPT). [9] reported that the prevalence of ovine brucellosis in Eastern Sudan was 1%, caprine 4% and cattle 5%. A weighed average of 25.1% prevalence rate was introduced to the economic model for assessment of the financial loss due to the disease. Accordingly the loss attributed to the disease was estimated at State, Locality and animal levels. Moreover, the cost due to reproduction, production and veterinary intervention was also quantified. The paper concluded that the disease constitutes a serious economic burden to the economy of the State and the producer in the absence of a formal control strategy [10].

This study was aiming at detection of bovine, caprine and ovine brucellosis in North Bahri, Sudan.

II. MATERIALS AND METHODS:

Area of Study:

This study was conducted out in North Bahri, Khartoum State (Sudan), during the year 2021.

Source of samples:

In this study which lasted for the year 2021, a total of 1050 bovine, 870 ovine and 2081 caprine blood samples were collected from Bahri North.

Sampling procedure:

Collection of blood samples:

Blood samples were collected in 10 mL sterile syringes from jugular vein. Sera were separated from blood samples by using centrifugation at 1000 rpm/ 5mins. Sera were stored in -20°C at the Laboratory of college of Veterinary Medicine University of Bahri.

Sample testing:

Rose Bengal Plate Test (RBPT):

Serum samples were tested for Brucella antibodies using the RBPT. The test was performed according to the provisions of the World Organization for Animal Health (OIE) Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (World Organization for Animal Health [11]). The antigen used in the RBPT was obtained from Central Veterinary Research Laboratory, Soba, Sudan. It was prepared and standardized as described by [12]. The serum samples and the antigen were removed from the refrigerator and placed at room temperature for an hour then the test was done by dispensing 0.025 ml of each serum to be tested to an enamel white plate. The same amount of RBPT antigen was added to each serum and both were thoroughly mixed, rocked by hand for four minutes after which the test was immediately read. Agglutination appeared as weak positive, positive, strong positive or very strong positive [12].

Modified Rose Bengal Plate (mRBPT 1:2)

This was similar to the classic Rose Bengal test but differed in the volume of serum used which was double or triple of the antigen volume (antigen to serum was 1:2). This procedure was deemed suitable for detection of weakly positive samples [13].

III- RESULTS:

Results of RBPT:

Out of 1050 bovine sera investigated with RBPT for presence of Brucella antibodies, 10 (0.95%) samples gave positive reaction with the antigen. Out of 2081 caprine sera investigated with RBPT for presence of Brucella antibodies, 234 (11.24%) samples gave positive reaction with the antigen. Out of 870 ovine sera investigated with RBPT for presence of Brucella antibodies, 10 (1.14%) samples gave positive reaction with the antigen (Table 1).

Table (1): Results of RBPT:

Species	No. of Samples	Positive samples	Negative samples
Bovine sera	1050	10 (0.95%)	1040 (99.05%)
Caprine sera	2081	234 (11.24%)	1847 (88.76%)
Ovine sera	870	10 (1.14%)	860 (98.86%)

Results of mRBPT:

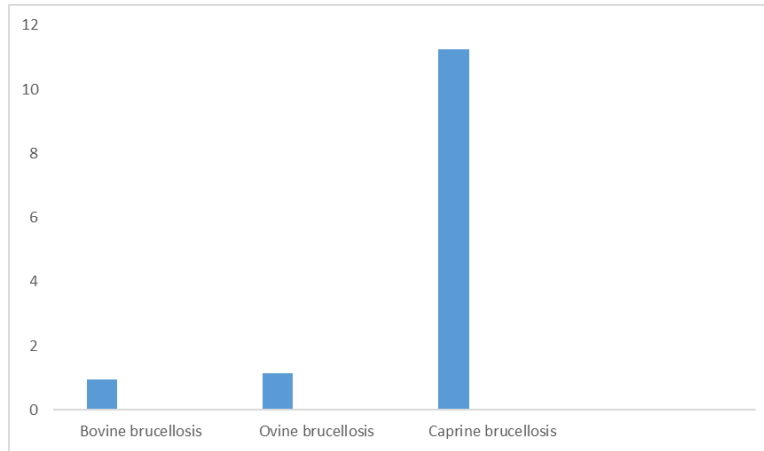
Out of 1050 bovine sera investigated with mRBPT for presence of Brucella antibodies, 15 (1.42%) samples gave positive reaction with the antigen. Out of 2081 bovine sera investigated with mRBPT for presence of Brucella antibodies, 288 (13.83%) samples gave positive reaction with the antigen. Out of 870 ovine sera investigated with mRBPT for presence of Brucella antibodies, 17 (1.95%) samples gave positive reaction with the antigen (Table 2).

Table (2): Results of mRBPT:

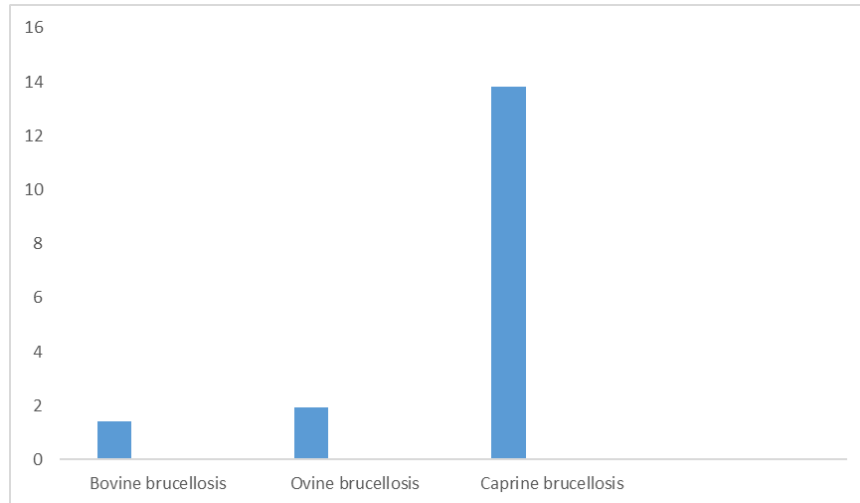
Species	No. of Samples	Positive samples	Negative samples
Bovine sera	1050	15 (1.42%)	1040 (98.58%)
Caprine sera	2081	288 (13.83%)	1847 (86.17%)
Ovine sera	870	17 (1.95%)	860 (98.05%)

Prevalence of bovine, caprine and ovine brucellosis in North Bahri by using RBPT:

By using RBPT for testing the sera for brucellosis, the prevalence of bovine brucellosis was 0.95, caprine brucellosis 11.24% and ovine brucellosis 1.14% (Figure 1).

**Fig. (1):** Prevalence of bovine, caprine and ovine brucellosis in North Bahri by using RBPT.***Prevalence of bovine, ovine and caprine brucellosis in North Bahri by using mRBPT:***

By using mRBPT for testing the sera for brucellosis, the prevalence of bovine brucellosis was 1.42, caprine brucellosis 13.83% and ovine brucellosis 1.95% (Figure 2).

**Fig. (2):** Prevalence of bovine, caprine and ovine brucellosis in North Bahri by using mRBPT:

IV. DISCUSSION:

Bovine brucellosis is a serious disease of livestock that has significant animal health, public health, and international trade consequences. Considering the damage done by the infection in animals (decreased milk production, weight loss, loss of young, infertility and lameness), this disease is a formidable threat to livestock. The fact that this disease can spread rapidly and be transmitted to humans makes it all the more serious. In this study which was conducted in Bahri North, out of 1050 bovine sera, 10 (0.95) were positive for brucella antibodies by using RBPT and the number increased to 15 (1.42%) brucella positive sera when mRBPT was used. Out of 2081 caprine sera, 234 (11.24%) were positive for brucella antibodies by using RBPT and the number increased to 288 (13.83%) brucella positive sera when mRBPT was used. Out of 870 ovine sera, 10 (1.14%) were positive for brucella antibodies by using RBPT and the number increased to 17 (1.95%) brucella positive sera when mRBPT was used. Higher percentage (4.5%) of positive bovine sera for brucellosis by using RBPT was reported by [14]. Also [15] found that 12% of the bovine sera samples collected from Khartoum State were positive for RBPT and 11% samples were positive for mRBPT. [16] found that 27% of the bovine sera samples collected from Khartoum State were positive for RBPT and 32.5% samples were positive for mRBPT. Also our study disagree with [17] findings that 12.6% of the bovine sera samples collected from Red Sea State were positive for RBPT and 25.7% of the sera positive for mRBPT. Our findings did not match with [18] who found that 7.8% of the bovine sera samples collected from Khartoum State were positive for positive RBPT and 33.3% samples were positive for mRBPT. Higher percentages of positive bovine sera for RBPT were found by [19] in Pakistan 3% and in Nigeria [20] 5.8% of serum samples were positive for RBPT. In this study the prevalence of bovine brucellosis was 0.95 using RBPT and 1.4% when mRBPT was used. The prevalence of caprine brucellosis was 11.24% using RBPT and 13.83% when mRBPT was used. The prevalence of ovine brucellosis was 1.14% using RBPT and 1.42% when mRBPT was used. In Khartoum State [21] found that the prevalence of bovine brucellosis was 25.7%, which is higher than our findings. In Eastern Sudan [22] detected the high prevalence of Bovine Brucellosis to be 2.6% by using RBPT and 3.4% by using the mRBPT in West Darfur State, Sudan. Also [8] reported higher prevalence of brucellosis (10.3%) in cattle, lower prevalence (7%) in sheep and higher prevalence (6%) in goats in West Darfur State by using RBPT. In White Nile State, Sudan [23] found that the prevalence of bovine brucellosis was 7.22% which is higher than the prevalence in this study. In line of higher percentages [24] reported that the prevalence of bovine Brucellosis was 6% by using RBPT and 12% by using mRBPT in White Nile State. Higher prevalence of bovine brucellosis (10%) was reported by [25] in Lebanon. Lower prevalence of caprine brucellosis (9.53%) by using RBPT, was reported by [26] in Bangladesh. They also reported higher percentage of ovine brucellosis (9.92%). Also higher prevalence of bovine brucellosis was found by [27] in Pakistan 18.6%, [28] in India 14.1% and [29] in Portugal 9.7%. [30] found that the pooled prevalence of brucellosis in ovine and caprine flocks in China increased in 2000–2009 (1.00%) to 2010–2018 (3.20%).

In this study we found that mRBPT is more sensitive than RBPT in detection of brucellosis, so that we are in the same line with [16] [17] [18] [22] [24] and in an opposite line with [15].

V. CONCLUSION:

From this study we conclude that the prevalence of bovine brucellosis in North Bahri was 0.95 by using RBPT and 1.4% when mRBPT was used. The prevalence of caprine brucellosis in North Bahri was 11.24% by using RBPT and 13.83% when mRBPT was used. The prevalence of ovine brucellosis in North Bahri was 1.14% by using RBPT and 1.42% when mRBPT was used. mRBPT is more sensitive than RBPT in detection of Brucella antibodies. Investigation of more animals covering the whole state, using of other serological and immunological test and vaccination of animals are recommended.

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