

Comparative Serological Study of Brucellosis in Aborted and Non-Aborted Buffalo

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Abstract

The current study aimed to determine the seroprevalence of Brucella in buffalo by use of five serological tests, for this purpose 205 serum sample were collected from buffalo in different physiological and pathological status. The result showed Rose Bengal test give positive results in rate of 10.73%. While tube agglutination test and 2mercaptoethanol test give positive results in rate of 4.39%, 4.87 % respectively. ELISA test gave positive results in rate of 7.80%. Coomps test succeed to diagnose 4 case out of 15 (26.6%) as positive which negative to all serological tests

Introduction

The buffalo classified to swamp and riverine buffaloes, it is seasonal polyestrous animal (extended from July to February). Period between parturition to next oestrus 100-150 days. (Singh et al.,2020; Mishra et al.,2019) Many infectious agents can infected genital system and caused abortion and reduced fertilization, these factors causes great economic losses. brucellosis is the main bacterial cause of genital disease. (Tulu et al.,2018)

Brucellosis transmitted through direct or indirect contact with sources of contamination (aborted fetuses, vaginal fluids, fetal membranes, urine, milk) (Mitik., & Desa, 2020)

Brucellosis infected pregnant buffaloes and caused abortion and retention placenta. in male causing inflammation of the testicles and epididymis, as well as infection of the joints, causing fluid accumulation in the knee joint hygroma (Bushra et al.,2017).

Brucellosis diagnosis by two methods, direct method (culture, pcr test, staining of sample by modifier Ziehl-Neelsen stain) and indirect methods (test detection of humoral and cellular immune response against brucella) such as Rose Bengal test, tube agglutination test, 2Me test, milk ring test, ELISA test. (Saavedra et al.,2019) No any serological test can give real diagnosis (Vakili et al.,2021) so that the current study conducted by multiple serological tests

Materials and methods

The current study conducted in Salahaldeen Governorate in period from January-2019 to December -2019.

Samples: blood sample were collected from 205 adult male and female buffaloes. sex, physiological and pathological status of these buffaloes described in table (1).

Table (1) sex, physiological and pathological status of these buffaloes

buffaloes Status	Number of samples
Adult Males	63
Adult females	84
Female abortion	21
Females pregnancy	37
Total	205

Serological Tests

- 1- Rose Bengal test: applied by use of kit (B. abortus antigen- LINEAR CHEMICALS - SPAIN) and according to (Alton et al.,1988)
- 2- Tube agglutination test : applied by use of Brucella melitensis Ag (febrile serodiagnosis – LINER CHEMICALS- spain) and according to (Alton et al.,1988)
- 3- 2mercaptoethanol : applied by use of - 2mercaptoethanol for serum dilution and Brucella melitensis Ag (febrile serodiagnosis –LINER CHEMICALS- spain) and according to (Alton et al.,1988)
- 4- iELISA test : applied by use of kit from (SVANOVIR®Brucella-Ab I-ELISA) and according to company manifestation.
- 5- Coomb's test: applied by use of Brucella melitensis Ag(Morganville- USA) and monoclonal antibody (BIOX-Diagnostic- Japan) according (Hall & Manion, 1953)

Results and discussion

Results of Rose Bengal test : the current study showed that of Rose Bengal test give positive results in rate of 10.73% , the highest rate recorded were 28.5% in abortion females and lowest rate were 7.93% in adult males. These result is agreed with result of (Özen et al.,2021; Al-Alo, & Mohammed , 2021; Ridhae& Hussein, 2021) the high result recorded in current study may be due to either the brucella in main causes of abortion in buffalo (Radostits et al.,2007) or the high efficiency of Rose Bengal in diagnosis of brucella.

Result of tube agglutination test the count study showed that tube agglutination test give positive results in rate of 4.39%, the highest rate are 14.2, recording in abortion females, and lowest was 1.85% in adule males, this result was closed to result of (Ahmed *etal.*, 2021, Zhou *etal* , 2021).

In compare between tube agglutination test and Rose Bengal test showed that positive results recorded in Rose Bengal test more than results recorded by tube agglutination test this due to ability of Rose Bengal to detection of IgG (which come from previous infection and vaccination) and IgM (acute infection) in compare with tube agglutination test which detected only IgM (Radostits et al.,2007)

Result of to 2mercaptoethanol reveals positive results in rate of 4.87 for all animals under study , the highest of them was 5.95 in adults female and lowest of them was 2.70 in pregnant female .The 2mercaptoethanol able to destruction of IgM in J-chain, so that this test is able to diagnosis previous

infection and vaccinated animals while unable to diagnosis of acute infection (Rahbarnia *et al.*, 2021)

Results of ELISA test : ELISA test gave positive results in rate of 7.80 for all animals under study and the highest rate of them was 9.52 in aborted female and lowest of them was 7.14 and 7.93 in adult male and female. in compare between ELISA test and 2mercaptoethanol show that ELISA test was more than 2mercaptoethanol and this attributed to high sensitivity of ELISA test and its ability to detection the rare titer of antibody (López *et al.*, 2021).

Buffalo status	No. of samples	Results of serological test							
		Rese Bengal test		Tube agglutination test		2mercaptoethanol test		ELISA test	
		Positive cases	rate	Positive cases	rate	Positive cases	rate	Positive cases	rate
Adults male	63	5	%7.93	1	%1.58	3	%4.76	5	%7.93
Adults female	84	7	%8.33	3	%3.57	5	%5.95	6	%7.14
aborted female	21	6	%28.5	3	%14.2	1	%4.76	2	%9.52
pregnant female	37	4	%10.81	2	%10.8	1	%2.70	3	%8.10
Total	205	22	%10.73	9	%4.39	10	%4.87	16	%7.80

Results of Coomps test : This test was applied for testing of serum taken from aborted female which are negative to all serological test diagnosis of brucella, out of 15 serum samples 4 samples gave positive result in rate of 26.6 and this results agreed with (Khurana *et al.*, 2021) .

References

1. Ahmed, M. R., Mostafa, A. E. D., & Abou Gazia, K. (2021). Conventional, Serological and Molecular Characterization of Brucella Species Isolated from Different Governorates in Egypt. *Journal of Current Veterinary Research*, 3(2), 107-117.
2. Al-Alo, K. Z., & Mohammed, A. J. (2021). A cross sectional study on the seroprevalence of bovine brucellosis in Al-Najaf province in Iraq. *Iraqi Journal of Veterinary Sciences*, 35(4), 617-620.
3. Bushra, E. B. K., Hassan, E. B. A., Hamd, M. B. A., Malla, M. M. D., Mohammed, S. M. I., & Yunis, T. M. A. (2017). *Serological Investigation of the disease Brucellosis among Cattle in West Omdurman, Khartoum State, Sudan* (Doctoral dissertation, Sudan University of Science and Technology).
4. Khurana, S. K., Sehrawat, A., Tiwari, R., Prasad, M., Gulati, B., Shabbir, M. Z., ... & Chaicumpa, W. (2021). Bovine brucellosis—a comprehensive review. *Veterinary Quarterly*, 41(1), 61-88.
5. López, M. V., Vinzón, S. E., Cafferata, E. G., Nuñez, F. J., Soto, A., Sanchez-Lamas, M., ... & Podhajcer, O. L. (2021). A Single Dose of a Hybrid hAdV5-Based Anti-COVID-19 Vaccine Induces a Long-Lasting Immune Response and Broad Coverage against VOC. *Vaccines*, 9(10), 1106.

6. Mishra, S. K., Dubey, P. K., Dhiman, A., Dubey, S., Verma, D., Kaushik, A. C., ... & Kataria, R. S. (2019). Sequence-based structural analysis and evaluation of polymorphism in buffalo Nod-like receptor-1 gene. *3 Biotech*, 9(1), 1-15.
7. Mitiku, W., & Desa, G. (2020). Review of Bovine Brucellosis and Its Public Health Significance. *Healthcare Review*, 1(2), 16-33.
8. Özen, H., İlhan, Z., Usta, M., Karaman, M., & İlhan, F. (2021). Brucellosis in a water buffalo (*Bubalus bubalis*) herd in Balıkesir province of Turkey: a bacteriological and pathological investigation. *The Thai Journal of Veterinary Medicine*, 51(1), 133-140.
9. Radostits OM, Gay CC, Hinchcliff KW, Constable PD. Pregnancy toxemia in sheep. In: *Veterinary Medicine*, Edn. 10th, Saunders Elsevier, Edinburgh 2007, 1668- 1671.
10. Rahbarnia, L., Farajnia, S., Naghili, B., & Saeedi, N. (2021). Comparative Evaluation of Nested Polymerase Chain Reaction for Rapid Diagnosis of Human Brucellosis. *Archives of Razi Institute*, 76(2), 203-211.
11. Ridhae, K. M., & Hussein, S. A. (2021). Serological and molecular investigations of Brucellosis in dairy cows at certain areas of Al-Sulaymaniyah governorate-Iraq. *Iraqi Journal of Veterinary Sciences*, 35(4), 657-662.
12. Saavedra, M. J., Fernandes, C., & Queiroga, C. (2019). Laboratory diagnosis of Brucellosis. *Brucellosis in Goats and Sheep: an endemic and re-emerging old zoonosis in the 21st century*, 151-180.
13. Singh, K. V., Das, R., Niranjana, S., Sodhi, M., & Kataria, R. S. (2020). Cytogenetic analysis reveals the swamp status of the indigenous “Bhangor” buffalo population from Tripura state. *Quarterly Research Journal of Plant & Animal Sciences/Bhartiya Krishi Anusandhan Patrika*, 35(4).
14. Tulu, D., Deresa, B., Begna, F., & Gojam, A. (2018). Review of common causes of abortion in dairy cattle in Ethiopia. *Journal of Veterinary Medicine and Animal Health*, 10(1), 1-13.
15. Vakili, S., Samare-Najaf, M., Dehghanian, A., Tajbakhsh, A., Askari, H., Tabrizi, R., ... & Noroozi, S. (2021). Gold Nanobiosensor Based on the Localized Surface Plasmon Resonance is Able to Diagnose Human Brucellosis, Introducing a Rapid and Affordable Method. *Nanoscale Research Letters*, 16(1), 1-11.
16. Zhou, Y., Meng, Y., Ren, Y., Liu, Z., & Li, Z. (2021). A retrospective survey of the abortion outbreak event caused by brucellosis at a blue fox breeding farm in Heilongjiang province, China. *Frontiers in veterinary science*, 8.