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A Comparison of One-Step Anigen® Rapid Bovine Tuberculosis Antibodies Test Sensitivity to Postmortem Gross Lesions in Diagnosing Bovine Tuberculosis in a Dairy Herd in Kaduna State

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Abstract: Sixteen lactating Bunaji dairy cows were screened for bovine Tuberculosis (bTB) using one-step Anigen® Rapid Bovine Tuberculosis Antibody Test (IQRT) specific for *Mycobacterium bovis* (*M. bovis*) antibodies. About 62% (10/16) of the lactating Bunaji cows screened were positive for antibodies to *M. bovis*. Six out of the ten positive cows were randomly selected culled and postmortem examination was conducted on them for the presence or absence of bTB gross lesion. Gross lesion was not observed in any of the culled cows examined. Though, the cows were exposed to *M. bovis*, probably infection is inapparent because bTB is a progressive and chronic disease.

Key words: Bovine tuberculosis, postmortem gross lesion, Bunaji dairy cows, *M. bovis*, IQRT, Nigeria

INTRODUCTION

The first report of bTB in Nigeria was made by Manley in 1929 (Alhaji, 1976), this was based on tuberculin test, postmortem gross lesion and laboratory examinations. Reports from the abattoirs in Nigeria also confirmed the existence of the disease in most part of the country (Alhaji, 1976; Ayanwale, 1984; Du-Sai and Abdullahi, 1994; Cadmus *et al*., 1999). Recent advances in cellular and humeral based responses have resulted in identification of additional use of specific antigen to improve the sensitivity and specificity of serological tests (Garnier *et al*., 2003). For instance, recently MPB70 protein was revealed to be a highly species specific protein secreted by *M. bovis* resulting in the development of Anigen® rapid bTB antibody test kit to capture and detect *M. bovis*, antibodies (IgM, IgG).

The aim of this study is to compare sensitivity Anigen® rapid bTB antibody test with postmortem bTB gross lesion examination in the diagnosis of bTB in Bunaji lactating dairy cows in Kaduna State, Nigeria.

MATERIALS AND METHODS

Sera samples were obtained from sixteen Bunaji lactating dairy cows presented for screening because of persistent coughing and drop in milk production. The cows were screened of bTB using IQRT.

Anigen® rapid bovine tuberculosis antibodies test procedure: Anigen® RAPID Bovine tuberculosis antibodies test kits specific for *M. bovis* antibodies containing the test devices and specimen droppers procured from Anigen® Animal Genetics Inc. in South Korea were used in detecting *M. bovis* antibodies in the sera collected.

The sera samples were stored at 2-8°C and allowed to attain room temperature (15-30°C) before use. The procedure was as follows:

- The test kit was removed from the foil pouch and placed on a flat, dry surface to attain room temperature
- Four (4) drops of the test serum were added slowly to the sample hole using the specimen dropper. Where the migration did not appear after one minute, one more drop of the test serum was added to the sample hole (Fig. 1)
- The test result was interpreted within 20 min. Result interpreted beyond 20 min was invalidated
- A test result was seen as a purple band in the result window of the kit (Fig. 2)
- The right section of the result window indicated the test results. If another colour band appeared in the right section of the result window, this band was the Test line (T) (Fig. 3)

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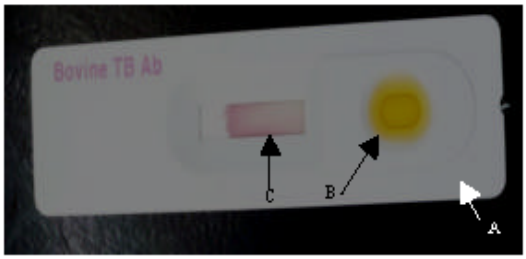

Fig. 1: Migration of the test serum from the sample hole to the result window. (A) IQRT kit, (B) Sample hole and (C) Result window

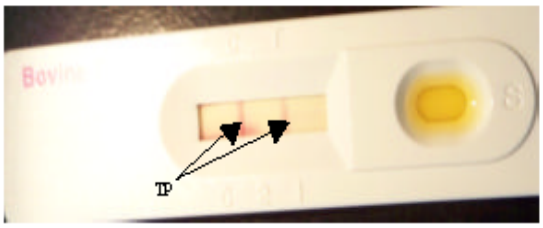

Fig. 2: A positive IQRT result showing two purple bands in the result window. (TP) Two purple bands

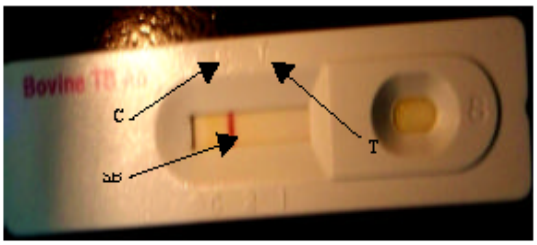

Fig. 3: A negative IQRT result showing a single band (Control) in the result window. (C) Control band position, (T) Test band position and (SB) Single band

RESULTS AND DISCUSSION

Negative IQRT result: The presence of only one purple colour band within the result window indicated a negative result (Fig. 3).

Positive IQRT result: The presence of two purple colour bands (T band and C band) within the result window, no matter which band appeared first indicated a positive result even if the intensity of the purple band colour was faint, it was interpreted as positive if it appeared within 20 min based on the recommendation of the manufacturer (Fig. 2).

Invalid IQRT result: Where the purple colour band was not visible within the result window after performing the test, the result was considered invalid (Fig. 1). This is because directions might not have been followed correctly or the test kit might have deteriorated. Based on the manufacturer's recommendation the specimen was re-tested. The results were recorded (Table 1).

Table 1: Comparison of IQRT positive cows with postmortem BTB gross lesion in cows that tested positive to IQRT

Cows' eartag No.	IQRT reaction	Postmortem BTB gross lesion examination
091	Positive	Not observed
012	Positive	
032	Negative	
142	Positive	Not observed
045	Negative	
036	Negative	
009	Negative	
011	Positive	Not observed
005	Negative	
014	Positive	
019	Positive	Not observed
023	Positive	
027	Negative	
123	Positive	
037	Positive	Not observed
019	Positive	Not observed
Total 16		

Six of the positive cows were culled and postmortem examination was carried for the presence or absence of bTB gross lesion. The results were recorded (Table 1).

Out of sixteen lactating Bunaji dairy cows presented for screening, 62% (10/16) reacted positively for *M. bovis* antibodies with IQRT (Table 1). No Postmortem bTB gross lesion was observed from the six randomly selected cows out of the ten IQRT positive cows culled and examined.

Though, the cows were exposed to *M. bovis*, probably the infection was in apparent because bTB is known to be a progressive and chronic disease. This result agrees with the previous report of National Research Council (1994) that bTB gross lesions are only seen in the chronic stage of the infection. This result indicates that postmortem examination for bTB gross lesion is less sensitive in diagnosing bTB at an early stage of infection as opposed to IQRT.

CONCLUSION

It was concluded that IQRT is more sensitive in diagnosing bTB than postmortem gross lesion. IQRT may be useful in diagnosing early infection of cattle with *M. bovis*, especially during test and slaughter programme as infected cattle may be detected early for culling before they lose their market value to carcass condemnation during postmortem meat inspection.

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