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Effects of Field Trypanosomosis on Blood Glucose and Urea Nitrogen Levels in Three Cattle Herds in Oyo State, Nigeria

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Abstract: *136 animals were sampled comprising White Fulani, Sokoto Gudali, Red Bororo, Azawoak, Red Bororo Crosses and Sokoto Gudali Crosses, to evaluate the effect of natural bovine trypanosomosis on the blood urea nitrogen and blood glucose levels in three herds in Oyo state.*

Jugular venipuncture, mid-coccygeal venipuncture and lateral saphenous venipuncture were used to obtain sample from live animals.

The blood glucose level was determined using glucometer with test kit strip while blood urea nitrogen was determined in the laboratory using BUN kit.

A White Fulani breed of cattle is the most common breed in Nigeria. Animals infected with trypanosomes had low blood glucose and blood urea nitrogen. White fulani cattle breed was said to be more susceptible to trypanosomosis, while Sokoto Gudali breed showed least susceptibility.

Keywords: *Trypanosomosis, cattle, blood glucose, blood urea nitrogen.*

1. INTRODUCTION

Blood glucose and blood urea nitrogen level in cattle has not been well researched in Nigeria. Hence, the Effect of Natural Trypanosomosis which has caused varieties of reported cases in cattle in sub-saharan Africa was studied in Oyo, a South-western state in Nigeria, where there is high preponderance of tsetsefly, on the blood glucose and urea nitrogen levels.

2. GLUCOSE SUPPLY

The ruminant is in a disadvantageous position as compared to monogastric animals with regard to glucose supply, because only limited amounts of glucose and/or glucose polymers reach the intestine. Little escapes in ruminal fermentation and reaches the duodenum unchanged. The amount may vary widely, but seldom exceed 25% of that supplied. Another minor portion of feed carbohydrates will be transformed into microbial polysaccharides and may reach the duodenum as stored microbial carbohydrate. Most of the compounds undergo fermentation in the rumen and are hydrolysed into acetic, propionic and butyric acids.

The availability of glucose or its precursors depends primarily on the amount of glucose that is absorbed from the intestine and on the amount of propionic acids produced in the rumen (1)

2.1. Implications of Increased Glucose Absorption

In the early 1990's, an extensive review of published studies concluded that 'production studies provide no clear evidence that site of starch digestion enhances milk yield or changes composition' (2), suggesting no benefit of greater, or less, postruminal starch digestion. In contrast, other studies have suggested a benefit of increased ruminal starch digestion on milk and or milk protein yield (3), perhaps as a consequence of increased microbial protein supply. However, these conclusions were based largely on effects of steam flaking on corn or sorghum grains, which also improved total tract starch digestibility and increased ME supply. In early lactation dairy cows, incremental starch infusion into the abomasum at relatively low rates (up to 2 kg/d) increased milk yield, but decreased

milk fat concentration in a quadratic manner such that there was little change in milk energy output except at the highest level of infusion (4).

2.2. Glucose and Trypanosomosis

Trypanosomes are avid feeders of blood glucose and they multiply rapidly and making the immune system of the animal compromised.

2.3. Blood Urea Nitrogen (BUN) in Ruminants

The level of blood urea nitrogen (BUN) have proven to be useful tools to monitor protein and energy nutrition of beef and dairy cattle under temperate conditions (5). However, up to date relatively little information is available on the relationship between this variable and the nutritional status of cattle fed on tropical forages. The knowledge of this relationship would allow the use of BUN as metabolic indicators of the protein and energy status of cattle and could be helpful in making nutritional management decisions (e.g. timing and level of protein supplementation). In pastures containing legumes high in tannins or BUN should be measured to estimate nitrogen availability in the rumen, Hess *et al.*, 2000).

2.4. Blood Urea Nitrogen and Trypanosomosis

Trypanosomes have found to cause serious systemic dysfunction and kidney happened to one of the organs affected. It affects the glomerula filtration rate and hence reduces the performance of the animals (Robbin et al 1999).

3. MATERIALS AND METHOD

This study was carried out in three different locations in the south west of Nigeria namely;

- University of Ibadan (Veterinary Teaching Hospital)
- Ilora Cattle Farm (Elede Farm Settlement Area) and
- Oyo State Government Cattle Farm, Fashola, iseyin

The locations of these areas of study using Global Positioning System (GPS) from the University of Ibadan are –

- University of Ibadan is located at 7^{o} 45' (N) and 3^{o} 89' (E), on Oyo road, Ibadan.
- Ilora Cattle Farm is located 7^{o} 79' (N) and 3^{o} 89' (E), a distance of about 75km from the University of Ibadan.
- Oyo State Government Farm, Fashola is located at 7^{o} 96' (N) and 3^{o} 6' (E) near Iseyin, a distance of about 85km from the University of Ibadan. (6).

In this study, 136 cattle breeds was sampled comprising White Fulani, Sokoto Gudali, Red Bororo, Azawouk and their various crosses, to evaluate the effect of natural trypanosomosis on their blood glucose and blood urea nitrogen parameters. *In situ* blood glucose levels determination were done using glucometer and blood urea nitrogen levels were determined in the laboratory using BUN kit (Randox Laboratories, Uk). Hematological parameters were determined using standard laboratory procedures.

Jugular venipuncture, Mid- Coccygeal venipuncture, and Lateral saphenous venipuncture techniques were used to obtain blood samples from the live cattle on the field.

Some of the pictures taken during the field work

4. RESULTS

White Fulani (WF) had 54 out of 117 sampled positive to Natural Tryanosomosis representing 46.15% positivity, while Sokoto Gudali (SG) and their Crosses had all 11 sampled negative to Natural Trypanosomosis representing 100 negativity

Table1. *Positivity and negativity of the breeds to natural Bovine Trypanosomosis*

Breeds	Positive	Negative
White Fulani	54	63
Azawouk	1	0
Red bororo	3	0
Red bororo crosses	1	4
Sokoto gudali	0	3
Sokoto gudali crosses	0	8

The Mean Blood Glucose levels for the WF positive to trypanosomosis was the lowest with (62.68 ± 9.73) mg/dl and SG which were 100% negative to trypanosomosis had the highest value of Mean Blood Glucose levels with (75.25± 20.47)mg/dl. This was in consonance with John *et al* (1992) who stated that trypanosomes have preference for glucose in the blood.

Table2. *Mean values of Glucose Parameters*

Breed	Mean Glucose ± SD
White Fulani	62.68 ± 9.73
Sokoto gudali	75.25 ± 20.47
Sokoto gudali crosses	55.67 ± 7.92
Red bororo	70.5 ± 6.36
Red bororo crosses	64.6 ± 8.2

SG also had highest mean BUN value of (1.92±0.40)mg/dl, while WF and Red Bororo crosses had mean BUN values of (1.59±0.49 and 1.47±0.62)mg/dl respectively as the lowest obtained values.

Table3. *Mean values of Blood Urea Nitrogen Parameters*

Breeds	Mean Blood Urea Nitrogen ± SD
White Fulani	1.59 ± 0.49
Other breeds	1.39 ± 0.40

5. CONCLUSION

It was found that Trypanosomosis had great preference for blood glucose and keeping a trypanotolerant breed of cattle in South-western Nigeria will help combat this.

The Blood Urea Nitrogen was observed to be very low in all breeds sampled. (5) reported that for animals with BUN level lesser than 9mg/dl, additional protein supplement with help the animal grow faster. Therefore, animals in the South-western Nigeria should be given protein supplement as part of their diet.

N/B- normal range values for Blood glucose and Blood Urea Nitrogen levels are 42.1-74.5mg/dl and 7.8- 24.6mg/dl respectively.

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