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HAEMATO-BIOCHEMICAL INDICES OF RABBIT BUCKS INFECTED WITH *TRYPANOSOMA BRUCEI BRUCEI*

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Abstract
This study was designed to determine the haematological values and plasma protein concentration of 20 adult rabbit (bucks), experimentally infected with *Trypanosoma brucei* over a period of 12 weeks. Ten out of the 20 rabbit bucks were inoculated intraperitoneally with 1ml of saline diluted blood containing 1 x 10^6 trypanosomes *T. brucei brucei*, while the remaining ten rabbit bucks were left uninfected. The infected rabbit bucks were monitored for nine weeks, while the others served as control post infection. There was progressive decrease in PCV with mean values of 40.07 ± 0.49 % and 36.42 ± 1.15 % for the control and infected groups, respectively. Haemoglobin concentrations had mean values of 14.31 ± 1.01^a g/dl and 12.21 ± 0.39^b g/dl for the control and infected groups, respectively, while plasma protein concentrations of infected and control groups had mean values of 6.48 ± 0.08^a gms/100ml and 6.41 ± 0.17^b gms/100ml, respectively. The study revealed a significant decrease ($p<0.05$) in haematological values and plasma protein concentrations of rabbit bucks infected with *Trypanosoma brucei* when compared to the control. It is therefore concluded that the metabolism and health status of rabbits infected with T. *brucei brucei* are altered which might lead to increase mortality.

Keywords: Rabbit bucks, *Trypanosoma brucei,* PCV, haemoglobin, plasma protein.

Introduction
Rabbit meat is ranked sixth after beef, fish, mutton, goat meat (chevon) and bush meat or game animals in the parametric assessment of meat animal production and consumption in Nigeria (Onifade *et al.,* 1999). High prices of beef, chevon, mutton, chicken and frozen fish makes rabbit meat preferable, and it is not only cheap to produce but saves cost of refrigeration as its meat is supplied in piece – meal suitable for a family's need or a small party (Ajala, 1990). White meat of rabbit is very nutritious, easily digestible and extremely low in cholesterol and sodium level (Omole *et al*., 2005). Trypanosomosis is a group of protozoan infections of both man and animals caused by trypanosomes. It is a major problem causing economic losses to crop and livestock production (Abebe, 2005). Since the rabbit is a non-traditional meat source in many homes, its husbandry is becoming increasingly important for various reasons including its low-venture starting capital and high multiplication rate. The present study was designed to determine the effects of trypanosome infection on haematological values and plasma protein concentration of rabbit bucks experimentally infected with *Trypanosoma brucei*.

Materials and Methods
Twenty (20) domesticated adult rabbit bucks weighing an average of 2.0 ± 0.8 kg were acquired from a rabbitry within Zaria metropolis of Kaduna State. The rabbit bucks were kept in individual fly proof cages and given access to growers mash and water was provided *ad libitum*. The rabbit bucks were randomly assigned into two groups; control and infected groups consisting of ten rabbit bucks, respectively.

Experimental Infection of the Animals

Stabilates of *T. brucei brucei* were acquired from the Department of Parasitology and Entomology of the Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria. Before infecting the rabbits, the trypanosomes were maintained by serial syringe passages in white rats, and periodically checked for the viability of the parasite. Blood was obtained from the passaged rats by tail bleeding into normal saline and the parasitaemia adjusted to 1 x 10^6 trypanosomes per milliliter (ml) by the method of Herbert and Lumsden, (1976). Each rabbit in Group B was inoculated intraperitoneally with 1ml of saline diluted blood containing 1 x 10^6 trypanosomes *T. brucei brucei*, while Group A rabbits served as uninfected control.

Collection of Blood Samples/ Haematological Analysis of the Blood Samples

Blood samples were collected from all the rabbits by venipuncture of the ear vein with 6 days post-infection for a total of 12 weeks. The site for the venipuncture was aseptically prepared and swabbed with methylated spirit and blood was collected into heparinised capillary tubes with 30 % of each capillary tube left unfilled. The open end of each of the tubes was carefully sealed with flame. The tubes were then loaded into a microhaematocrit centrifuge (Hawksley, England) and centrifuged at 15,000 rpm for 3 minutes.

The packed cell volume (PCV) was estimated using the microhaematocrit method and haemoglobin concentration was analyzed by the cyanmethaemoglobin method as described by Baker and Silverton, (1985) during the course of the experiment. The total plasma protein was determined using the hand refractometer as described by Benjamin (1985).

Statistical Analysis

Data generated on haematological parameters were expressed as mean ± standard error of the mean (SEM). Student t-test was used to test for differences between groups using Graph pad prism version 5.0 statistical software. Values of $P<0.05$ were considered statistically significant.

Results and Discussion

The mean haematological values and plasma protein concentrations are presented in Tables 1, 2
and 3 respectively.

Table 1: Mean (±SEM) Packed Cell Volume (%) of infected and non-infected rabbit bucks pre and post infection.

Period Time	Control (n=10)		Infected (n=10)	
(Weeks)	Mean	SEM	Mean	SEM
Pre-infection 1	38.60	1.28	40.60	0.72
2	39.11	1.16	41.30	1.25
Week of infection 3	39.11	1.16	37.70	0.78
Post infection 4	39.11	1.16	33.10	2.07
5	38.71	1.45	34.50	1.45
6	39.00	1.44[a]	32.50	1.44[b]
7	39.29	1.44 [a]	31.38	1.89[b]
8	41.33	2.54	35.75	2.48
9	42.83	2.82 [a]	33.00	1.39[b]
10	42.50	1.65	43.67	1.87
11	42.50	1.65	39.00	2.02

	12	40.95	0.35 [a]	38.86	0.26[b]

ab Means in the same row of each parameter with different superscript letters are statistically ($p<0.05$) different.

There was statistically significant difference in the haemoglobin values among the control and infected groups of the bucks at weeks 7, 8 and 10. The control and infected bucks had a total mean post infection haemoglobin value of 14.31±1.01 g/dl and 12.21±0.39 g/dl respectively.

Table 2: Mean (±SEM) Haemoglobin Concentration (g/dl) of infected and non - infected rabbit bucks pre and post infection.

Period Time		**Control (n=10)**		**Infected (n=10)**	
(Weeks)		**Mean**	**SEM**	**Mean**	**SEM**
Pre-infection	1	12.86	0.42	13.54	0.24
	2	13.03	0.39	13.97	0.26
Week of infection	3	13.03	0.39	12.56	0.28
Post infection	4	25.26	12.19	11.04	0.69
	5	12.88	0.40	11.50	0.48
	6	12.90	0.46	11.50	0.49
	7	13.00	0.49 [a]	10.85	0.48 [b]
	8	13.09	0.49 [a]	10.45	0.63 [b]
	9	13.60	0.82	12.33	0.91
	10	13.77	1.14 [a]	11.00	0.46[b]
	11	14.17	0.54	14.55	0.62
	12	14.17	0.54	13.18	0.79

ab: Means in the same row of each parameter with different superscript letters are statistically ($p<0.05$) different.

Statistically, there was significant difference in the mean plasma protein values at weeks 6 and 11 among the groups. The control and infected rabbit bucks had a total mean post infection plasma protein value of 6.48 ± 0.08 gms/ml and 6.41 ± 0.17 gms/ml.

Table 3: Mean (±SEM) Plasma Protein Concentration (gms/100ml) of infected and non-infected rabbit bucks pre and post infection.

Period Time		**Control (n=10)**		**Infected (n=10)**
(Weeks)		**Mean**	**SEM**	**Mean**
SEM				
Pre-infection	1	6.21	0.37	6.07
0.18				
	2	6.35	0.31	6.00
0.12				
Week of infection	3	6.35	0.31	6.26
0.17				
Post infection	4	6.14	0.14	5.77
0.11				
	5	6.50	0.22	5.88
0.08				

6	6.50	0.22[a]	5.80
0.18[b]			
7	6.50	0.22	6.48
0.25			
8	6.00	0.22	6.34
0.14			
9	6.93	0.19	6.90
0.39			
10	6.90	0.10	6.83
0.21			
11	6.67	0.21 [a]	7.72
0.29[b]			
12	6.67	0.21	6.83
0.27			

ab: Means in the same row of each parameter with different superscript letters are statistically ($p<0.05$) different.

The drop in the PCV values observed during the course of the infection and the eventual increase in the PCV values noticed had been reported by Mbaya *et al*., (2011). There were fluctuations in the total plasma protein with a peak increase at 8 weeks post infection in consistence with the findings of Rajora *et al.,* (1968) who had an increase in total serum protein level to a peak at 21 days post infection but disagree with Sadique *et al.,* (2001) who reported decreased in total protein in cattle infected with *T. congolense*. The increase in total protein could be due to increase demand for the sub-fraction involved in the immune responses like immunoglobulin M (IgM) for the control of the infection (Takeet and Fagbemi, 2009). This study has provided some evidences that T. *brucei brucei* is pathogenic to rabbit bucks and that they could serve as reservoirs of the infection for ruminants and domesticated dogs used as pets and for hunting However, further studies should be carried out in tsetse endemic areas on the role of nutrition in the Pathogenicity and haemato- biological values of T. *brucei brucei* infection in rabbit bucks. Further studies be carried out to ascertain if chemotherapy can limit the infection and enhance early recovery from clinical and haemato-biological damages and which of the chemotherapeutic agent is more potent and safest in the treatment of the infection in rabbit bucks.

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