HAEMATOLOGICAL CHARACTERISTICS OF WEANER RABBITS FED DIETS CONTAINING GRADED LEVELS OF AFRICAN WILD GRAPE (*LANNEA MICROCARPA*) LEAF MEAL

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ABSTRACT
This experiment was conducted to ascertain the haematological characteristics of weaner rabbits fed diets containing African wild grape (Lannea microcarpa) leaf meal at different level of inclusion. Forty (40) mongrel weaner rabbits, of about six (6) weeks of age weighing 750g±50 were randomly allotted to five (5) dietary treatments, replicated four (4) times with two (2) rabbits per replicates in a completely randomized design (CRD). Five (5) diets of 16% crude protein consisting of Lannea microcarpa leaf meal at 0, 5, 10, 15, and 20% were formulated as treatment 1, 2, 3, 4 and 5 respectively. The Results revealed no significant difference (P>0.05) in terms of Packed Cell Volume (PCV), haemoglobin concentration (Hb), and Mean Capsular Haemoglobin Concentration (MCHC). However, significant difference (P<0.05) was observed in the values of White Blood Cells (WBC), Mean Capsular Volume (MCV) and Red Blood Cells (RBC) and Mean Corpuscular Haemoglobin (MCH). The haematology parameters analysed were all within the normal range for healthy rabbit. It is therefore concluded that African wild grape (Lannea microcarpa) leaf meal has no adverse effect on haematological parameters of weaner rabbit and farmers can supplement up 20% in rabbit diets.
Keywords: Weaner rabbit, Heamatological, African wild grape (*Lannea microcarpa*).

INTRODUCTION

The physiology of farm animals is affected by several factors, one of which is nutrition (Ajao *et al*., 2013). Nutritional status of an individual is dependent on dietary intake and effectiveness of metabolic processes. These can be determined by either or combinations of chemical, anthropometric, biochemical or dietary methods (Bamishaiye *et al*., 2009). The blood profiles of animals might be influenced by certain factors one of which is nutrition. Addass *et al*. (2012) posited that nutrition affects blood values of animals. The processing methods of feed could have effect on haematological parameters of farm animals (Aya *et al*., 2013). Dietary content affect the blood profile of healthy, animals as reported by Kortuglu *et al*., (2005). Haematological components which consists of red blood cells, white blood cells or leucocytes (Isaac *et al*., 2013), Mean Corpuscular Haemoglobin and Mean Corpuscular Haemoglobin Concentration are valuable in monitoring feed toxicity, especially with feed constituents that affect the blood as well as the health status of farm animals (Aro *et al*., 2013 and Akinmoegun, 2012). Haematological parameters; haematocrit value, haemoglobin concentration, white blood cell count and red blood cell count are used in routine screening for the health, physiological status of livestock and even humans (Aderemi, 2004).

The use of forages and other agricultural by-products such as *Tridax precumbens* (Taiwo *et al*., 2005), *Moringa oleifera* (Odeyinka *et al*., 2008), *Acacia nilotica* (Abdu *et al*., 2011), composite cassava meal, *Commelina benghalensis*, *Leucerna leucocephala*, *Boerhavia diffusa* and *Impomia triloba* (Yakubu *et al*., 2012 and Ukachukwu *et al*., 2011) have been documented. However, information on the effect of African grapes (*Lannea microcarpa*) or wild grapes commonly known as *'Faaru'* in Hausa, on Haematological parameters is limited. Therefore, this study was designed to determine the effect of diets containing African wild grape (*lannea microcarpa*) leaf meal at different level of inclusion on the haematological characteristics of Weaner Rabbit.

MATERIALS AND METHODS

Location of Experiment

The research was conducted at the Teaching and Research Farm of Federal University Dutse, Jigawa State, Nigeria. Dutse is located between latitude 11^0 45′ 22.25" and longitudes 9^0 20′ 20.26" E, at an altitude of 485 m above sea level (Encarta, 2007). The state is situated within the Sudan Savannah Vegetation Zone, but there are traces of Guinea savannah in the southern region of the State (Olofin *et al.,* 2008).

Experimental design

Forty (40) mongrel weaner rabbits, of about six (6) weeks of age weighing averagely 750g±50 were randomly allotted to five (5) dietary treatments, replicated four (4) times with two (2) rabbits per replicates in a completely randomized design (CRD). Five (5) diets of 16% crude protein consisting of *Lannea microcarpa* leaf meal at 0, 5, 10, 15, and 20% were formulated as treatments 1, 2, 3, 4 and 5, respectively.

Source of Experimental Materials

African wild grape leaves were sourced from Jahun Local Government Area, Jigawa State. The leaves were collected and transported in jute bags to the Teaching and Research Farm of Federal University Dutse, where they were air-dried and later milled with a milling machine Abro (P 207) and bagged for diet formulation.

Table 2: Composition and Calculated Analysis of the Experimental Diet (%)

	TREATMENTS				
Ingredient	**(T_1)0%**	**(T_2)5%**	**(T_3)10%**	**(T_4)15%**	**(T_5)20%**
Maize	43.00	43.00	43.00	43.00	43.00
Soya bean cake	15.90	15.90	15.90	15.90	15.90
African wild grape leaf	0.00	5.00	10.00	15.00	20.00
Wheat offal	36.60	31.60	26.60	21.60	16.60
Bone meal	3.50	3.50	3.50	3.50	3.50
Table salt	0.30	0.30	0.30	0.30	0.30
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Vitamin. Premix	0.30	0.30	0.30	0.30	0.30
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Calculated Analysis					
Crude Protein (%)	16.00	16.00	16.00	16.00	16.00
Metabolized Energy(kcal/kg)	2270	2267	2263	2259	2256
Crude Fibre (%)	15.23	19.17	17.90	16.63	15.34
Ether Extract (%)	4.56	4.45	4.98	5.33	5.12
Ash (%)	6.32	6.19	5.34	6.02	5.88

Blood collection

At the end of the study, blood sample was collected from 4 Animal per treatment. About 1mL of blood sample was drawn through the prominent ear vein of each rabbit using a 2L disposable syringe and 23 G needles between 07:00 and 08:00 hours in the morning. The blood sample collected was deposited into a container tube containing anticoagulant: ethelynediamine tetra acetic acid (EDTA). The samples were placed in a cold box containing ice packs and transported immediately to the laboratory for hematological analyses.

Statiscal Analysis

The data collected were subjected to analysis of variance (ANOVA) to determine significant differences among treatment means according to Steel and Torrie (1980). Where there were

significant differences between means, the means were separated using the Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

Results

The haematological parameters of the experimental animals are presented in Table 2. No significant difference (P>0.05) was recorded in packed cell volume (T1 = 37.53±32.72%, T2=35.35±30.49%; T3 = 38.03±28.22 %; T4 = 34.25±27.53 and T5 = 36.15±34.35), haemoglobin concentration (T1 = 11.63±1 g/100mL 0.31; T2 = 11.40±9.83g/100mL; T3 =12.33±10.40 g/100mL; T4 = 11.20±9.98 g/100mL and T5=12.05±11.12 g/100mL), and mean capsular haemoglobin concentration (T1 = 31.80±31.12 %; T2 =32.25±30.48%; T3 = 32.05±29.24%; T4 = 32.45±29.40% and T5 = 31.77±30.63%), However, significant difference (P<0.05) was recorded in the values of White blood cells (T1 = 8.73±0.65x $\times 10^9$/L; T2 = 7.95±1.08$\times 10^9$/L; T3 = 10.800±0. $\times 10^9$/L; T4 = 6.38±0.91 $\times 10^9$/L and T5 = 16.60±0.47 $\times 10^9$/L), Mean Capsular Volume (fl) (T1 = 70.46±64.84; T2 = 67.00±61.64; T3 = 62.23±59.70; T4 = 71.58±65.96 and T5 = 63.05±62.35) and Red blood cells (T1 = 5.20±0.14 ($\times 10^{12}$/L); T2 = 5.23±0.14 ($\times 10^{12}$/L); T3 = 6.81±0.69 x106 /mm3; T4 = 4.78±0.22 ($\times 10^{12}$/L) and T5 = 5.67±0.17 ($\times 10^{12}$/L)) and Mean Corpuscular Haemoglobin (pg) (T1 = 22.47±20.60 pg; T2 = 21.83±19.98 pg; T3 = 20.08±8.33; T4 = 23.18±20.65 pg and 20.13±19.48 pg.

Table 2. Haematological parameters on weaner rabbit fed diet containing African wild grape leaf

Parameters	T_1	T_2	T_3	T_4	T_5	P-Value
PCV (%)	37.53±32.72	35.35±30.49	38.03±28.2	34.25±27.53	36.15±34.35	0.645
Hb (g/100mL)	11.63±10.31	11.40±9.83	12.33±10.0	11.20±9.98	12.05±11.12	0.408
Total WBC($\times 10^9$/L)	8.73±0.65	7.95±1.08	10.800±0.1	6.38±0.91	16.60±0.47	0.001
M CV (*fl*)	70.46±64.84	67.00±61.64	62.23±59.0	71.58±65.96	63.05±62.35	0.001
MCHC (%)	31.80±31.12	32.25±30.48	32.05±29.4	32.45±29.40	31.77±30.63	0.937
MCH (*pg*)	22.47±20.60	21.83±19.98	20.08±8.33	23.18±20.65	20.13±19.48	0.005
RBC ($\times 10^{12}$/L)	5.20±0.14	5.23±0.14	6.81±0.69	4.78±0.22	5.67±0.17	0.009

Hb (Haemoglobin), PCV (packed cell volumne), RBC (red blood cell), WBC (white blood cell), MCV (mean carpuscular volume), MCH (mean corpuscular haemaglobin), MCHC (mean corpuscular haemoglobin concentration

Discussion

The packed cell volume recorded in this study (34.25±27.53% to 38.03±28.22) was within the normal range 31 – 50%, reported by Schalm *et al*. (1975). However the values were slightly higher than 21.0 ± 3.53 – 30.0 ± 1.84 obtained by Olabanji *et al*. (2007) for rabbits. The haemoglobin values obtained in the present study (11.20±9.98 to 12.33±10.40 g/100ml) were also within the normal ranges 10 – 15 g/dl and 10 – 17.5 g/dL reported by Flecknell (2000) and Medirabbit (2011) for rabbits respectively. The normal haemoglobin contents across the treatments indicated that the leaves were quite safe for the normal physiological function of haemoglobin such as transport of oxygen and carbon (iv) oxide to and from tissues of the body of the rabbits (Njidda *et al.,* 2006). The White Blood Cells Count (WBC) observed in the present study 6.38±0.91-16.60±0.47 ($\times 10^9$/L were higher than 4.68 ± 0.36 – 5.9 ± 0.69($\times 10^9$/L Reported by Olabanji *et al*. (2007) for rabbits. However the values were in agreement with 8.72 – 9.56 observed by Togun *et al.* (2007). Reilly (1993) opined that

normal range of values for WBC indicated that the animals were healthy because decrease in number of WBC below the normal range is an indication of allergic conditions, anaphylactic shock and presence of parasites. Higher WBC count may explain the reason for disease resistance which has been reported by Nwosu (1979) or the prevalence of disease condition. Furthermore, the values of MCV observed in this study (62.23±59.70 fl to 71.58±65.96 fl) were contrary with 60.15 fl – 60.18 fl reported by Togun *et al.* (2007), however the values were similar with 71.03 and 69.07 fl observed for rabbits fed fresh and wilted pawpaw leaves by Henry *et al.* (2016). Similarly, the MCH obtained in this study range from 20.08±8.33 pg to 23.18±20.65 pg was in conformity with the values reported by Henry *et al.* (2016). The RBC count obtained in this experiment (4.78±0.22 to 6.81±0.69 $\times 10^{12}$/L)) were within the normal range (4.00 – 8.60$\times 10^{12}$/L) as established by Mitruka and Rawnsley (1977). Normal RBC count is an indication that the leaves have no any negative effects on experimental animals.

CONCLUSION

The Results obtained from this study showed that feeding African wild grape (*Lannea microcarpa*) leaf meal has no adverse effect on haematological parameters of weaner rabbit. Moreover, it demonstrated an increased white blood cell count thereby boosting the immunity of the experimental animals.

Recommendation

It is therefore recommended that farmers can supplement African wild grape (*Lannea microcarpa*) leaf meal in rabbit up 20% level of inclusion without any deleterious effect.

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