

HAEMATOLOGICAL RESPONSE OF WEANER RABBITS FED DIETARY LEVELS OF *GMELINA ARBOREA* LEAF MEAL

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Abstract

A 49 day experiment was conducted to determine the haematological parameters of weaner rabbits fed dietary levels of *Gmelina arborea* leaf meal (GALM). The rabbits were randomly divided into four (4) experimental groups of six (6) animals per treatment in a completely randomized design (CRD). Four dietary treatments (T_1 , T_2 , T_3 and T_4) were formulated to contain 0%, 10%, 20% and 30% levels of GALM. Haematological characteristics studied are packed cell volume (PCV), Haemoglobin (HB), Red blood cells (RBC), white blood cells (WBC), mean corpuscular haemoglobin (MCH), mean corpuscular Haemoglobin concentration (MCHC) and mean corpuscular volume (MCV). The experimental diets had significant ($P < 0.05$) influence in all the haematological indices evaluated. From the results, it could be concluded that inclusion of 30% *Gmelina arborea* leaf meal had no adverse effects on the haematological parameters of weaner rabbits.

Introduction

With increasing demand for animal protein as a result of rapid population growth and shrinking land area, future hope of feeding millions of people and safeguarding their food security will depend on the production of animals with short generation interval such as rabbits and better utilization of non-conventional feed resources. This has been recognized as one of the most effective means of improving animal performance in smallholder livestock production (Blair, 1989). *Gmelina arborea* is one of the unconventional materials explored for the production of feedstuff. *Gmelina arborea* leaf is one of the tree leaves considered as an important source of nutrient for ruminants and non-ruminants, especially in those areas with a pronounced dry season. The leaves, flower, roots and bark are used in medicine (Himalaya, 2002). A paste of the leaves is applied to the head for the relief of headache (Khare, 2010). The leaves are used in dyspepsia, cough, and wound treatment (Dinesh, 2009). The leaf has been reported to have antihelmintic activity (Ambujakshi *et al.*, 2009). Nkwocha *et al.* (2014) recommended an inclusion level of 10% of *Gmelina arborea* leaf meal (GALM) in the diets of grower rabbits to boost performance and enhance profitability. While Opara *et al.* (2012) reveals the ability of aqueous extracts of *G. arborea* leaves to increase oxygen carrying capacity of rabbits, by increasing their RBC counts. This study, therefore, was designed to investigate the effect of *Gmelina arborea* leaf meal on the haematological parameters of weaner rabbits.

Materials And Methods

Experimental site and Management of Animals:

The experiment was carried out at the Rabbitary Unit of Federal College of Agriculture, Ishiagu, Ivo Local Government Area of Ebonyi state. Twenty four (24) weaner rabbits were used for this experiment and were randomly divided into four (4) experimental treatments of six animals per treatment and replicated two times with three animals per replicate and housed in a standard hutch equipped with feeders and drinkers. The animals were assigned the four experimental diets in a Completely Randomized Design (CRD). Each rabbit received the assigned diet for 49 days. The rabbits were dewormed, vaccinated and given acaricides bath prior to the experiment.

Experimental Diet: Fresh leaves of *Gmelina arborea* were harvested within the College and were air dried. The dried leaves were processed and milled using hammer mill. Four (4) experimental diets (T_1 , T_2 , T_3 and T_4) were formulated at 0%, 10%, 20% and 30% inclusion levels of *Gmelina arborea* leaf meal (GALM) respectively as presented in table 1 below.

Blood Sample Collection: Blood samples were collected from one animal per replicate at the end of the study. Methods of UKo *et al.* (2000) were used and thus were achieved by puncturing the ear vein and allowing free flow of blood into labeled sterile universal bottles. This was used to determine the haematological component according to the method of Uko *et al.* (2000).

Data Analysis: All data were subjected to Analysis of variance (ANOVA) applicable to

Completely Randomized Design (Steel and Torrie, 1980). Significant means were separated using Duncan's Multiple Range Test (Duncan, 1995). According to SPSS

Results And Discussions

The hematological profile of rabbit fed varying levels of *Gmelina arborea* leaf meal is presented in table 2. There were significant differences ($P < 0.05$) among the treatment groups for all the haematological parameters. The Pack Cell Volume (PCV) values (32.41- 41.37%) obtained in this study compared with 34.00 to 41.00% reported by Njidda and Isidahomen (2010) for growing rabbits. The normal values observed in the concentration of PCV suggest the absence of toxic factor like haemagglutamin which could have adverse effect on blood formation (Oyawoye and Ogunkule 1998). The haemoglobin value of T_1 differed ($P < 0.05$) significantly from the treatments containing GALM (T_2 , T_3 and T_4). The haemoglobin (Hb) concentration compared favourably with the values of 9.70- 13.70g/dl reported by Njidda and Isidahomen (2010). Animals fed T_4 diet had the highest Hb concentration of 12.62g/dl, and fell within the normal range of 9.4 - 17.4 reported by Fudge

(1999). Hackbath *et al.* (1983) recorded a strong influence of diet on haematological traits, PCV and Hb being very strong indicators of nutritional status of animals. The high level of Hb of the treatment diets may imply that the dietary proteins were of high quality. The red blood cell (RBC) count showed significant differences ($P < 0.05$) among treatments. The values were within the range of $3.07 - 7.50 \times 10^6/\text{mm}^3$ reported by Fudge (1999) but higher than $3.0-3.35 \times 10^{12}$ reported by Ocheja *et al.* (2011) for rabbits. Hackbath *et al.* (1983) reported that increased RBC values were associated with high quality dietary protein and with disease free animals. These observations were related to the composition of the diet and the health status of the rabbits since no rabbit died as a result of any disease.

The MCH (pg), MCV (fl) and MCHC (%) were all significant ($P < 0.05$). The MCV range of 78.97 - 88.97 fl was in tandem with the values reported by Burnett *et al.* (2003) and higher than (54.71- 68.34 fl) reported by Ogunsipe and Agbede (2012) for rabbits. Similarly, the values 28.34 - 33.51% observed for MCHC in this study relatively compared well with 31.00 - 31.70 reported by Ogunsipe and Agbede, (2012). MCV and MCH values could reflect anaemic condition and the

Table 1: Composition of the experimental diet

Ingredients	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)
Maize	43.00	43.00	43.00	43.00
Wheat	22.00	22.00	22.00	22.00
P.K.C	11.00	11.00	11.00	11.00
Fish Meal	3.00	3.00	3.00	3.00
Soyabean	15.00	14.25	13.5	12.75
GALM	0.00	0.75	1.5	2.25
Bone meal	3.0	3.0	3.0	3.0
Premix	1.0	1.0	1.0	1.0
Salt	0.50	0.50	0.50	0.50
Lysine	0.20	0.20	0.20	0.20
Methionine	0.25	0.25	0.25	0.25
Total	100	100	100	100

Table 2: Haematological profile of weaner rabbit fed diet containing *Gmelina arborea* leaf meal.

Parameter	T_1	T_2	T_3	T_4	SEM
PCV (%)	35.31 ^c	32.41 ^d	37.96 ^b	41.37 ^a	1.25
HB (g/dl)	9.55 ^b	11.06 ^a	11.31 ^a	12.62 ^a	0.48
RBC($\times 10^6/\text{ul}$)	4.39 ^d	5.36 ^c	6.51 ^b	7.10 ^a	0.40
MCHC(%)	28.34 ^d	30.45 ^c	32.60 ^b	33.51 ^a	0.76
MCH(pg)	19.21 ^c	21.51 ^b	22.37 ^b	23.41 ^a	0.60
MCV (fl)	78.97 ^c	84.01 ^c	86.00 ^b	88.97 ^a	1.39
WBC($\times 10^3/\text{dl}$)	4.90 ^c	5.69 ^c	7.95 ^b	10.52 ^a	0.83

^{a, b, c} means in the row with different superscripts are significantly different ($p < 0.05$)

capacity of the bone marrow to produce RBC of normal size and metabolic capacity. However MCHC is very significant in the diagnosis of anaemia. Njidda and Hambagda (2006) mentioned PCV, Hb and MCHC as the most dependable blood indices for assessing the health status of animal. The normal MCV, MCHC and MCH recorded in this study for the rabbits gave a clear indication of the absence of anaemia among the experimental animals.

The white blood cell count (WBC) in this present study ranged from $3.80 - 9.70 \times 10^{12/l}$, and are within the range of $5 \text{ to } 13 \times 10^3/\text{mm}^3$ reported by Hillyer (1994) for healthy young rabbits. These results indicate that the animals were healthy because decrease in number of WBC below the normal range is an indication of allergic conditions, anaphylactic shock and certain parasitism, while elevated values (leucocytosis) indicate the existence of a recent infection, usually with bacteria (Ahamefule *et al.*, 2008).

Conclusion

From the results, it could be concluded that weaner rabbits could tolerate up to 30% *Gmelina arborea* leaf meal in their diets without adverse effects on their blood haematological characteristics.

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