Effect of Bitter Leaf Meal (*Vernonia amygdalina*) on Haematological Indices and Blood Glucose Level of Rabbits

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ABSTRACT

In a ten-week feeding trial, fifty six mixed breeds of rabbits were used to evaluate the effect of bitter leaf meal (BLM) on the haematological indices and blood glucose level. Four concentrate mash diets were compounded with inclusion of BLM at 0%, 5%, 10% and 15% . Data obtained were statistically analyzed with the General Linear Model of SAS and means were separated using the Duncan Multiple Range Test. The proximate composition in this study showed that bitter leaf had DM (94.70%), CP (20.48%), CF (11.15%), EE (7.05%) and Ash (13.30 %). The DM decreased as the inclusion level of BLM increased in the diets while the Ash content was highest in 15% BLM (34.35, followed by 10% BLM (32.25), 0% BLM (29.90) and 5% BLM (29.50) while the CP content of diets 5% BLM, 10% BLM and 15% BLM were higher than 0% BLM diet. However, the ME content of the experimental diets decreased as the inclusion level of BLM increased in the diets. The rabbits fed diets 0% BLM (8.77) and 5% BLM (8.03) had significantly higher ($p<0.05$) RBC counts than diets 10% BLM (6.74) and 15% BLM (6.67) diets while the MCV and MCH counts were higher in rabbits fed diets 10% BLM and 15% BLM than other diets. However, there were no significant differences ($p>0.05$) in the MCHC, WBC, PCV and Hb values of rabbits fed the experimental diets. Furthermore, there were no significant differences ($p>0.05$) among the blood glucose levels of rabbits fed the experimental diets. Therefore, it could be concluded that inclusion of bitter leaf meal (BLM) in the diets of rabbits up to 15% had no deleterious effect on the haematological indices and blood glucose level.

Key words: Bitter leaf, haematological, blood, glucose level

INTRODUCTION

Rabbits play a very important role in the supply of animal protein to Nigerians especially in the rural and peri-urban areas. They are efficient converters of feed to meat and can utilize up to 30% crude fibre as against 10% by most poultry species (Egbo *et al* 2001). However, the quality and quantity of available feed resources pose a major problem to animal production especially during the dry season when forages are scarce and limiting in essential nutrients. This leads to search for forages that are cheap and available all year round such as bitter leaf. It is an indigenous Africa plant species; which grows in most parts of sub-Sahara Africa. The leaf meal is a proteinous feed resource 20 – 34% CP (Owen *et al.*, 2009) and can serve medicinal purposes. Olosunde and Odeyinka (2018) observed that bitter leaf can be included up to 15% in the diets of WAD goats without negative effect on performance. However, limited information is available on its utilization as dry season forage feed source in the diets of rabbits. Thus, this study evaluated the haematological indices and blood glucose level of rabbits fed bitter leaf meal (BLM).

MATERIALS AND METHODS

The experiment was conducted at the Rabbit Unit of the Teaching and Research farm, Obafemi Awolowo University. The experiment lasted for a period of 10 weeks. Four concentrate mash diets were compounded with BLM at 0%, 5%, 10% and 15% graded levels (Table 1). Fifty-six rabbits of both sexes, comprising of different crosses of breeds of rabbit were used in this experiment. The animals were 6 weeks old (550-1000g). They were randomly allotted to four treatments in a completely randomized design. One animal each were housed in a cage with a dimension of 23 x 18 x 15 inches. The rabbits were provided with the moist mash experimental diets and clean water ad libitum daily. The *Vernonia amygdalina* leaves were harvested from the Teaching and Research Farm, Obafemi Awolowo University and air dried for one week as established by Olosunde and

Odeyinka (2017). Proximate analysis of processed bitter leaf sample and experimental diets were determined by standard methods (AOAC, 2000). The haematological parameters were determined using the procedure of Baker and Silverton (1976) while blood glucose level was measured using glucometer.

RESULTS AND DISCUSSION

The proximate composition in this study showed that bitter leaf (BL) (Table 2) had DM (94.70%), CP (20.48%), CF (11.15%), EE (7.05%) and Ash (13.30 %). The CP and EE of BL in this study were lower than 44% and 9.20% respectively for pulped BL (Sodamade, 2013). The CF in this study was comparable to report of Asaolu *et al.* (2012) for sun dried BL. Furthermore the Ash content was lower than 15.2% (Udochukwu *et al.,* 2015) for air-dried BL. The differences in the proximate composition might be attributed to the different processing methods adopted in these studies. The DM decreased as the inclusion level of BLM increased in the diets while the Ash content was highest in 15% BLM (34.35, followed by 10% BLM (32.25), 0% BLM (29.90) and 5% BLM (29.50) while the CP content of diets 5% BLM, 10% BLM and 15% BLM were higher than 0% BLM diet. However, the ME content of the experimental diets decreased as the inclusion level of BLM increased in the diets. The CP of diets in this study fell within 12-16% reported by Mmereole *et al.* (2011) for growing rabbits. The CF decreased with increasing level of BLM and was observed to fall within 11.0-16.0% reported by Ayandiran and Odeyinka (2016) for diets containing bread waste and *Moringa oleifera* leaf. The metabolizable energy of all the experimental diets in this study was lower than 2588-2995kcal/kg reported by Mufwa *et al.* (2011) for growing rabbits fed diets containing graded levels of brewers dried grain. Thus BLM might not be regarded as a total energy source in the diets of rabbits. The rabbits fed diets 0 % BLM and 5% BLM had significantly higher ($p<0.05$) red blood cell (RBC) counts than diets 10% BLM and 15% BLM diets while the mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH) counts were higher in rabbits fed diets 10% BLM and 15% BLM than other diets (Table 3). However, there were no significant differences ($p>0.05$) in the mean corpuscular haemoglobin concentration (MCHC), white blood cell (WBC), packed cell volume (PCV) and haemoglobin (Hb) values of rabbits fed the experimental diets. Furthermore, there were no significant differences ($p>0.05$) among the blood glucose levels of rabbits fed the experimental diets. Esonu *et al*. (2001) stated that, haematological constituents reflect the physiological responsiveness of the animal to its internal and external environment, feed and feeding inclusive. The result obtained in this study shows that PCV of rabbits were within the normal range reported by Burns and Lannoy (1966) who considered the normal PCV of a healthy rabbit to be between 30-50%. The red blood cells indices (MCH, MCV, and MCHC) are important morphological characteristics of anaemia (Campbell, 1988) which also fell within the normal range reported by Mitruka and Rawnsley (1977). The Hb in this study was lower than 11.82-13.60 stated by Terzungwe *et al*., (2013). The blood glucose values observed across all the levels of BLM inclusion were within the recommended range (80 - 150 mg/dl) reported by University of Pennsylvania School of Veterinary Medicine (2002).

CONCLUSION

It could be concluded that inclusion of bitter leaf meal (BLM) in the diets of rabbits up to 15% had no deleterious effect on the haematological indices and blood glucose level.

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Table 1: Gross composition of experimental diets

Ingredient (%)	0%BLM	5%LBM	10%BLM	15%BLM
Maize	25	23.75	22.50	21.25
BLM	-	1.25	2.50	3.75
Corn bran	26.00	26.00	26.00	26.00
Brewer's dried grain	35.00	35.00	35.00	35.00
Soybean meal	5.00	5.00	5.00	5.00
Groundnut cake	5.00	5.00	5.00	5.00
Bone meal	1.50	1.50	1.50	1.50
Oyster shell	1.00	1.00	1.00	1.00
Palm oil	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25

Table 2: The proximate composition of experimental diets fed to rabbits

Parameter	BL	0%BLM	5%BLM	10%BLM	15%BLM
Dry matter (%)	94.70	96.05	95.40	94.95	94.05
Crude protein (%)	20.48	13.03	14.08	14.20	14.50
Crude fibre(%)	11.15	16.55	16.15	15.20	14.75
Ether Extract (%)	7.05	7.65	8.30	8.55	8.70
Ash(%)	13.30	29.90	29.50	32.25	34.35
Nitrogen Free Extract (%)	42.72	28.92	27.37	24.75	21.75
ME (kcal/kg)	2845.35	2131.42	2164.90	2096.58	2013.33

Table 3: Haematolological indices and blood glucose of rabbits fed BLM

Parameter	0%BLM	5%BLM	10%BLM	15%BLM	SEM	PROB
RBC ($\times 10^6/mm^3$)	8.77^a	8.03^a	6.74^b	6.67^b	0.26	0.001
MCV (fl)	25.80^c	27.11^c	35.48^a	34.57^a	1.57	0.04
MCH (pg)	8.61^b	8.92^b	11.86^a	11.76^a	0.53	0.02
MCHC (g/dl)	33.33	32.97	33.50	34.02	0.20	0.27
WBC ($\times 10^3/mm^3$)	10.52	9.84	9.78	9.97	0.14	0.20
PCV (%)	22.40	21.80	23.80	22.40	0.66	0.78
Hb (g/dl)	7.48	7.18	7.96	7.62	0.22	0.69
Blood Glucose (mg/dl)	96.40	143.80	129.20	107.80	10.81	0.44