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HAEMATOLOGICAL CHARACTERISTICS OF RABBITS FED GRADED LEVELS OF SWEET POTATO VINE SUPPLEMENTED WITH METHIONINE AND LYSINE

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ABSTRACT

A study was conducted to examine the haematological characteristics of rabbits fed graded levels of sweet potato vines supplemented with methionine and lysine. Seventy-two (72) weaner rabbits of mixed breed and sexes with initial live weight between from 600g and 1130g. The rabbits were randomly allocated to twelve treatments in a 3 x 2 x 2 factorial arrangement in a completely randomized design. Results showed that, Pack cell volume, white and red blood cells increased (P>0.05) as level of sweet potato vine increased. They were highest in rabbits on 30 % sweet potato vine and least in rabbits on 0% sweet potato vine. Haemoglobin concentration was higher in rabbits on 15 and 30 % sweet potato vine than rabbits on 0 % sweet potato vine. Rabbits on 15 % sweet potato vine level had a higher (P<0.05) significant glucose level than those on 0 and 30 % sweet potato vine. Packed cell volume, haemoglobin concentration, white blood cell and red blood cell counts were all significantly (P<0.05 and (P<0.01) affected except for glucose level where rabbits on 0.10 kg high level of methionine had higher (P<0.05) significant packed cell volume, haemoglobin concentration, white and red blood cell counts than those on low level methionine. Only white blood cell count was significantly (P<0.05) affected by lysine supplementation. Similarly, rabbits on high level of lysine had higher (P<0.05) significant white blood cell count than those on low lysine supplementation. It was concluded that feeding rabbits with sweet potato vine up to 30 % level with methionine and lysine supplementation did not lead to any deleterious effect on haematological characteristics of rabbits.

Keywords: Haematology, Sweet potato vine, Methionine and Lysine, Rabbits, Supplementation

INTRODUCTION

Blood acts as a pathological reflector of the whole body. Hence haematological parameters are important in diagnosing the functional status of animals exposed to toxic substances (Etim *et al.,* 2014) Haematological indices reflect the effect of dietary treatments on the animal in terms of the type, quality and amount of the feed ingested and available for the animal to meet its physiological, biochemical and metabolic necessities (Ewuola *et al*., 2004). Reports by Aletor and Egberongbe (1992) and Aletor (1989) indicated that the blood variables most consistently affected by dietary influences include red blood cell count, packed cell volume, plasma protein and glucose.

Most of the non-conventional legumes (even conventional) used in animal nutrition contain some anti-nutritional properties which affect their utilization in the raw (unprocessed) state by livestock. These inevitably, influence the haematological properties of the animal blood (Amaefule, 2002). Pigeon pea (*Cajanus cajan*) contains trypsin inhibitor and haemaglutin which affect growth and performance of livestock in the raw state (Amaefule, 2002). Processing methods therefore influence quality of compounded rations or diets and thereby affect blood biochemical and haematological properties (Akinmutimi, 2004). Ani (2007) stated that the inclusion of lysine in some diets did not have any significant effect on PCV and haemoglobin of birds.

Many studies have been conducted using various leaf meals as protein sources such as cassava leaf meal (Ng and Wee, 1989), alfalfa (Yousif *et al*., 1994), *Leucaena leucocephala* leaf meal (Bairagi *et al*., 2004) and sweet potato leaf meal (Antia *et al*., 2006; Adewolu, 2008; Wude and Berhan, 2009; Mmerole, 2009), *Carica papaya* and other leaf meals (Reyes and Fermin, 2003).

In the past decades, studies have been carried out to identify alternative and non-conventional feed resources which are cheap and easily available for poultry production (Esonu *et al*., 2003; Ekenyem, 2007; Mmerole, 2009). Sweet potato (*Ipomoea batatas*) belongs to the morning-glory family *convolvulaceae*. It is cultivated in over 100 nations and ranks fifth among the most important food crops in the tropical areas (An, 2004). The leaves of this plant have been used in the tropics as cheap protein source in ruminant feeds (Adewolu, 2008). Studies have been conducted to determine the nutritive value of sweet potato leaves (SPL). According to Woolfe (1992), Teguia *et al*. (1997), Ishida *et al*. (2000), An (2004), Nguyen and Ogle (2004) and Ekenyem and Madubuike (2006), the leaf meal has a high crude protein content of between 24-33%, with high amino acid content with good mineral profile and vitamins A, B, C and E. Apart from its nutritive value, SPL can be harvested many times throughout the year (Hong *et al*., 2003). One major factor limiting the use of this leaf meal is the presence of anti-nutritional factors (Tacon, 1993) which according to Oyenuga (1968) are the invertase and protease inhibitors and by Antia *et al*. (2006) are cyanide, tannins, oxalate and phytate. However, these substances can be inactivated by various processing methods such as oven or sun-drying, boiling or steaming and grinding prior to inclusion in the feed (Adewolu, 2008). Also, the leaves are deficient in an essential amino acid: - lysine, necessitating the inclusion of adequate lysine in poultry diets (Fuller and Chambellain, 1982).

Osime *et al*. (2008) fed sweet potato leaves extract to rabbits and found that there was a significant increase in packed cell volume, white blood cell count and platelet count. Increase in haematological parameters after feeding with sweet potato leave extract may be a direct effect on haemopoietic tissues (Osime *et al*., 2008). Conversely, Elamin *et al*. (2011) found that sweet potato meal provided a good protein and energy feed for growing rabbits and had no effect on blood constituents. The objective of this study was to determine the haematological characteristics (glucose level, packed cell volume, red and white blood cell counts and haemoglobin concentration) of rabbits fed graded levels of sweet potato vines supplemented with methionine and lysine.

MATERIALS AND METHODS

Study Area

The study was carried out at Bayero University, Kano Animal Science Farm Research Unit. It is located at the new site of the University, about 5 Km West of Kano City in Ungogo Local Government Area of Kano State. Kano is located within the general area demarcated by the lines of longitude 8°E and 9°E and latitude 12°N and 13°N in the Northern Guinea Savannah Zone of Nigeria. The area has two seasons, a wet season (May-September) and dry season (October-April). The annual temperature and rainfall ranges between 21°C and 39°C and 787mm to 960mm (KNARDA, 2001).

Source of animals and Sampling Techniques

Rabbits used for this study were obtained from a local farmer and a total of 72 rabbits were used. A total of six rabbits were allocated to three replicates with two rabbits per replicate for each treatment diet.

Experimental Design

A 3 x 2 x 2 factorial arrangement in a Completely Randomized Design was used for this study. The factors were sweet potato vine at 0, 15 and 30% level, methionine at low (0.07 kg) and high (0.10 kg) level, lysine at low (0.12 kg) and high (0.15 kg) level. The treatments were allocated to the experimental units completely at random. The experimental layout for the experiment is as shown in Table 1.

Table 1: Layout of a factorial arrangement in a Completely Randomized Design.

Sweet potato vine %	**0**		**15**		**30**	
Methionine level	Low	High	Low	High	Low	High
Lysine level	Low High	Low High	Low High	Low High	Low High	Low High

Response of a parameter to the treatment is given by the model below:

$y_{ijkl} = \mu + \alpha_i + \beta_j + \gamma_k + (\alpha\beta)_{ij} + (\alpha\gamma)_{ik} + (\beta\gamma)_{jk} + (\alpha\beta\gamma)_{ijk} + e_{ijkl}$.

Where;

y_{ijkl} = observation of factor 1 level i, factor 2 level j and factor 3 level k for the i^{th} unit

μ = population mean of y, α_i = effect of factor 1 (sweet potato vine); β_j = effect of factor 2 (methionine); γ_k= effect of factor 3 (lysine); $(\alpha\beta)_{ij}$ = interaction of factor 1 and factor 2

$(\alpha\gamma)_{ik}$ = interaction of factor 1 and factor 3; $(\beta\gamma)_{jk}$ = interaction of factor 2 and factor 3

$(\alpha\beta\gamma)_{ijk}$ = interaction of factor 1, factor 2 and factor 3; e_{ijkl} = random variation of the observation

Experimental Animals, Feed and Management

Seventy-two heterogeneous breeds of rabbits of both sexes between six to seven weeks of age with initial live weight ranging from 600g to 1130g obtained from a local farmer were used for the study.The animals were dewormed with Wormazine Hydrosoluble Anthelmintic at a dosage of 1 g/litre of drinking water, Keproceryl WSP (Hydro soluble mix of antibiotics and vitamins) at a dosage of 0.5g/litre of drinking water was given as antibiotics for 5 days and Anupco Vitalyte at dosage of 10 to 20 litres of drinking water as an anti-stress factor. The rabbits were initially weighed with the aid of a pan scale [Capacity; 10 Kg x 50 g] before the feeding trial and the treatment diets were gradually given to the rabbits just to replace the feed, they were used to for a week in order to allow the rabbits adjust to the experimental diets.

The rabbit house and cages were thoroughly cleaned and disinfected before placing the rabbits in the cages with the dimensions of 0.5m x 0.5m x 0.5m ($0.125m^3$) and particle ceiling-board on the floor. The house and cages were cleaned daily. Aluminum feeder boxes with dimensions of 0.25m x 0.10m x 0.8m were used as feed trough in feeding the rabbits. The feeding was once per day between 8. 00a.m and 9.00a.m. Clean water was supplied *ad libitum* to the rabbits in aluminum waters boxes with dimensions of 0.20m x 0.10m x 0.8m. Feed not eaten was collected in the morning, weighed as leftover feed and used to determine feed intake. The feeders and waterers were washed with clean water daily before new feed and water were given. The sweet potato foliage was sun-dried and milled to obtain the sweet potato vine meal. The chemical composition of the sweet potato vine is shown in Table 2, while Table 3 shows the composition of treatment diets fed to the rabbits.

Haematological Study

Blood samples were collected from three animals per replicate per treatment for the haematology analysis. Blood samples from each of the rabbit in the treatment groups were obtained using a 5ml plastic syringe by drawing blood from jugular vein and emptied into well labelled plastic tubes that contained Ethylene Diamine Tetra-acetic acid (EDTA) as an anticoagulant. Blood criteria such as the glucose level, packed cell volume, red blood cell count, white blood cell count and haemoglobin (Hb) concentration were analysed. The red blood cell (RBC) and white blood cell (WBC) counts were measured using the improved Neubauer haemocytometer (common medium), the total number of cells per ml were obtained by simply multiplying the total number of cells found in the haemocytometer grid by 10^4 (10000), while the packed cell volume (PCV) was determined by

using the Wintrobes Microhaematocrit, and the haemoglobin (Hb) concentration by Cyanamet-haemoglobin method (Coles, 1986). Similarly, blood samples collected without anticoagulant were used for the determination of glucose level, using the commercially available analytical kits (Glucose monitor) according to Feteris (1965). This was done by dropping a drop of the blood on the monitor slip and inserted back into its chamber and after few seconds the meter displayed the level of glucose in the blood sample.

Table 2: Proximate composition of sweet potato vines

Parameter	**Dry matter (%)**
Dry matter	85.69
Crude protein	18.35
Crude fibre	14.14
Ash	12.10
Ether extract	0.27
Nitrogen free extract	40.83
Acid detergent fibre	22.90
Neutral detergent fibre	25.84
Hemicellulose	2.94

Table 3: Composition of treatment diets

Sweet potato vine (%)	**0**				**15**				**30**			
Methionine level	**Low**		**High**		**Low**		**High**		**Low**		**High**	
Lysine level	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Ingredients												
Maize	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97	21.97
Maize offal	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31
Wheat offal	14.66	14.66	14.66	14.66	12.46	12.46	12.46	12.46	10.26	10.46	10.26	10.26
Sweet potato vine	0.00	0.00	0.00	0.00	2.20	2.20	2.20	2.20	4.40	4.40	4.40	4.40
Rice bran	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31	18.31
Groundnut cake	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03	23.03
Bone meal	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Palm oil	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Premix	25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Methionine	0.07	0.07	0.10	0.10	0.07	0.07	0.10	0.10	0.07	0.07	0.10	0.10
Lysine	0.12	0.15	0.12	0.15	0.12	0.15	0.12	0.15	0.12	0.15	0.12	0.15
Calculated value												
Crude protein	17.60	17.61	17.63	17.50	17.50	17.48	17.51	17.59	18.02	18.03	18.06	18.09
Crude fibre	20.4.5	20.45	20.45	20.44	20.96	21.40	21.81	21.79	23.08	22.87	23.02	23.07
ME (Kcal/Kg)	2602.10	253120	2531.20	2548.10	2548.10	2547.30	2549.00	2548.10	2564.10	2564.30	2565.10	2566.00

Roche VM502 premix supplied per Kg diet; Vitamin A: 12000 I.U; Vitamin D_3: 12000 I.U; Vitamin E: 3.6 I. U; Vitamin K: 1.8 mg Vitamin B_2: 3.6 mg; Nicotinate: 18 mg; Calcium-d-Pantothenate: 9.6 mg; Biotin: 0.36 mg; Vitamin B_{12}: 0.12 mg; Choline chloride: 120 mg; Chloteteracycline: 4.8 mg; Manganese: 24 mg; iron: 48 mg; zinc: 96 mg; Copper: 60 mg; Iodine: 1.8 mg; Cobalt: 48 mg;
ME = Metabolizable energy

Table 4: Proximate composition of treatment diets (%)

Sweet potato vine (%)	**0**				**15**				**30**			
Methionine level	**Low**		**High**		**Low**		**High**		**Low**		**High**	
Lysine level	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Parameters												
Dry matter	87.11	87.08	87.11	87.10	85.83	85.91	85.95	86.03	88.36	85.91	84.77	85.77
Moisture	12.89	12.92	12.89	12.90	14.17	14.09	14.05	13.97	11.64	14.09	15.24	14.23
Crude protein	17.64	17.64	17.69	17.72	17.53	17.52	17.57	17.62	18.07	18.07	18.09	18.11
Crude fibre	21.61	21.62	21.59	21.61	21.36	22.37	22.35	22.35	24.35	24.34	24.32	24.33
Ether extract	6.55	6.57	6.63	6.61	6.46	6.46	6.51	6.46	6.35	6.35	6.42	6.40
Ash	8.33	8.34	7.27	8.30	8.21	7.24	8.24	8.24	8.12	8.13	7.20	8.16
Nitrogen free extract	45.90	45.84	46.82	45.77	45.43	46.41	45.34	45.33	42.89	43.10	43.98	43.00
Acid detergent fibre	67.87	67.53	64.10	65.37	58.37	60.20	66.30	62.73	67.30	67.03	66.77	63.10
Neutral detergent fibre	76.07	77.93	75.62	76.52	74.95	73.52	73.81	74.66	77.09	76.20	75.51	77.11
Hemicellulose	8.20	10.40	11.52	11.15	16.58	13.32	7.51	11.93	9.79	9.17	8.74	14.01

Statistical analysis

All data collected were subjected to analysis of variance using the General Linear Model Procedure (PROC GLM), for factorial experiment in a complete randomized design packaged in SAS (1987). When analysis of variance indicated significance for treatment effects, specific differences between means were detected and separated by Pair-wise Difference (pdiff) and Duncan's Multiple Range as described by Steel and Torrie (1980) and Duncan (1955).

RESULTS

Table 5 shows the effect of sweet potato vine level on rabbit haematological characteristics. Pack cell volume, white and red blood cells increased as level of sweet potato vine increased. Packed cell volume, white and red blood cells were highest in rabbits on 30 % sweet potato vine and least in rabbits on 0% sweet potato vine. Haemoglobin concentration was higher in rabbits on 15 and 30 % sweet potato vine than rabbits on 0 % sweet potato vine. Rabbits on 15 % sweet potato vine level had a significantly ($P<0.05$) higher glucose level than those on 0 and 30 % sweet potato vine.

Table 6 presents the effect of methionine supplementation on rabbit haematological characteristics. Packed cell volume, haemoglobin concentration, white blood cell and red blood cell counts were all significantly ($P<0.05$ and $P<0.01$) affected by methionine supplementation except for glucose level. Rabbits on high level of methionine had higher packed cell volume, haemoglobin concentration, white and red blood cell counts than those on low level methionine. Only white blood cell count was significantly ($P<0.05$) affected by lysine supplementation. Rabbits on high level of lysine had higher white blood cell count than those on low lysine supplementation.

The interaction between sweet potato vine level and methionine supplementation on haematological characteristics of rabbit is presented in Figure 1. Result obtained revealed there was interaction between sweet potato vine level and methionine supplementation on haematological characteristics except glucose level. Packed cell volume and haemoglobin concentration increased at 0 % sweet potato vine at high methionine supplementation and decreased at 15 % sweet potato vine at high methionine supplementation and was similar on 30 % sweet potato vine at low and high methionine supplementation level.

Rabbits on 0 % sweet potato vine at low methionine supplementation had the lowest packed cell volume and haemoglobin concentration. White and red blood cell counts increased at 0 % sweet potato vine at high methionine supplementation and remained similar at 15 and 30 % sweet potato vine with methionine supplementation level. Rabbits on 0 % sweet potato vine at low methionine supplementation had lowest white and red blood cell counts.

Figure 2, present the interaction between sweet potato vine level and lysine supplementation on haematological characteristics of rabbit. Packed cell volume, white and red blood cell counts increased at 0 % and 30 % sweet potato vine with high lysine supplementation and decreased at 15 % sweet potato vine with high lysine supplementation. Rabbits on 0 % sweet potato vine at low lysine supplementation had the lowest packed cell volume, white and red blood cell count. Haemoglobin concentration increased at 0 % sweet potato vine with high lysine supplementation and decreased at 15 and 30 % sweet potato vine with lysine supplementation level. Haemoglobin concentration was lowest in rabbits on 0 % sweet potato vine at low lysine supplementation level.

Figure 3, show the interaction between methionine and lysine supplementation on haematological characteristics of rabbit. Haemoglobin concentration, white and red blood cells count were affected by interaction between methionine and lysine supplementation. Haemoglobin concentration, white and red blood cell counts were similar at low and high methionine with lysine supplementation and decreased at high

methionine and high lysine supplementation level for haemoglobin concentration. Rabbits on high methionine at high lysine supplementation had lowest haemoglobin concentration, white and red blood cell counts.

In Figure 4, the interaction between sweet potato vine level, methionine and lysine supplementation on the haematological characteristics of rabbits is presented. White blood cell count and glucose level did not vary significantly (P>0.05). Packed cell volume was similar on low and high lysine on low methionine and increased on high methionine high lysine at 0 % sweet potato vine, at 15 % sweet potato vine, it decreased on high lysine on low and high methionine supplementation while at 30 % sweet potato vine, it increased on high lysine on low methionine but remained similar on high and low lysine on high methionine supplementation level. Packed cell volume was lowest in rabbits on 0 % sweet potato vine at low methionine and low lysine supplementation level. Haemoglobin concentration and red blood cells increased at 0 % sweet potato vine with methionine and lysine supplementation and decreased at 15 % sweet potato vine on low methionine, high lysine being similar on high methionine, low and high lysine, while being similar for all methionine and lysine supplementation levels at 30 % sweet potato vine level. Haemoglobin concentration and red blood cell count were lowest in rabbits on 0 % sweet potato vine at low methionine and low lysine supplementation level.

Table 5: Effect of sweet potato vine level on haematology characteristics of rabbit

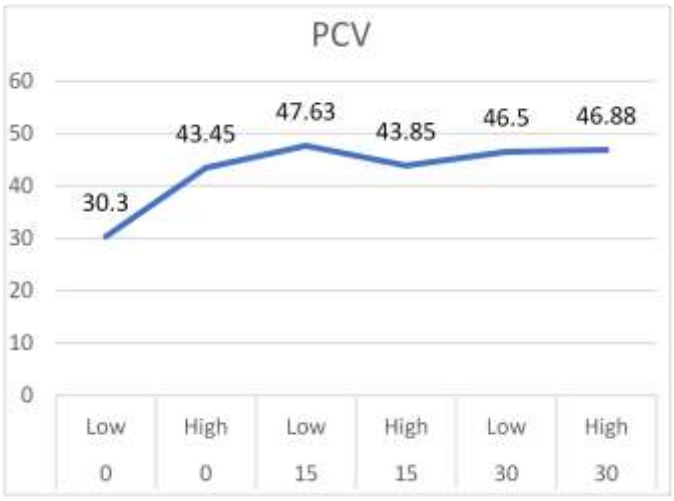
	Sweet potato vine level (%)				
Parameters	**0**	**15**	**30**	**SE**	**P. Values**
Packed cell volume (%)	40.88^{c}	45.74^{b}	46.69^{a}	0.08	<0 .0001
Haemoglobin (g/dl)	11.13^{b}	12.18^{a}	11.72^{a}	0.21	0.0086
White blood cell ($x10^3$/mm)	4.78^{c}	5.24^{b}	6.16^{a}	0.10	<0.0001
Red blood cell ($x10^6$/mm)	3.65^{c}	4.23^{b}	4.55^{a}	0.07	<0.0001
Glucose (mmol/l)	4.28^{b}	4.58^{a}	4.34^{b}	0.28	0.0319

[abc] Means with the same superscript within row are similar, LOS = Level of Significant, SE = Standard Error

Table 6: Effect of methionine and lysine supplementation on haematology characteristics of rabbit

	Methionine Level				Lysine Level			
Parameter	**Low**	**High**	**SE**	**LOS**	**Low**	**High**	**SE**	**P. Values**
Packed cell volume (%)	42.55^{b}	46.32^{a}	0.07	<0.0001	44.14	44.73	0.07	0.1106
Haemoglobin (g/dl)	11.37^{b}	11.98^{a}	0.06	0.0247	11.63	11.72	0.06	0.7105
White blood cell ($x10^3$/mm)	4.77^{b}	6.01^{a}	0.08	<0.0001	5.15^{b}	5.63^{a}	0.09	0.0015
Red blood cell ($x10^6$/mm)	3.91^{b}	4.38^{a}	0.17	<0.0001	4.12	4.16	0.18	0.6725
Glucose (mmol/l)	4.35	4.45	0.24	0.2947	4.38	4.42	0.25	0.7239

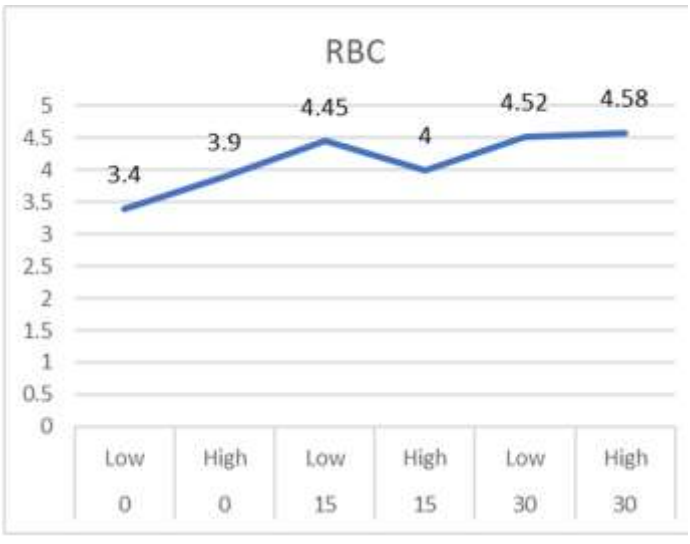
[abc] Means with the same superscript within row are similar, SE = Standard Error, LOS = Level of Significance



(a) Packed Cell Volume



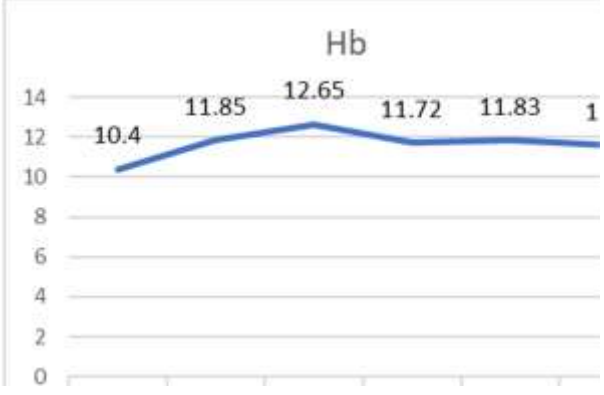
(b) Glucose



(c) Haemoglobin

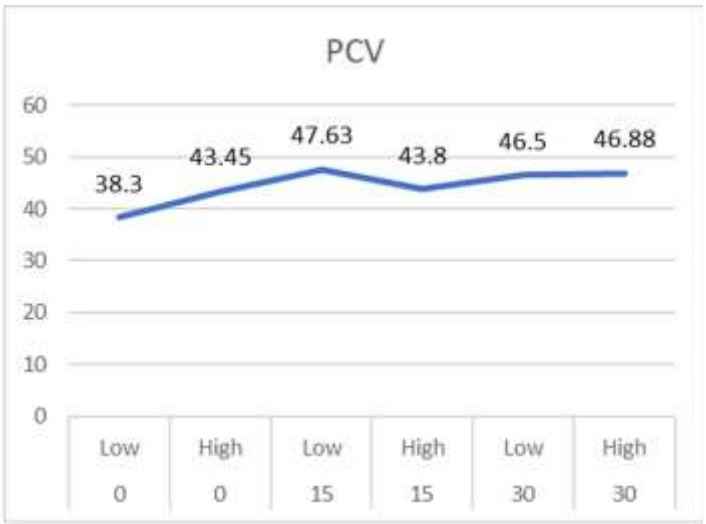


(d) White Blood Cell



(e) Red Blood Cell

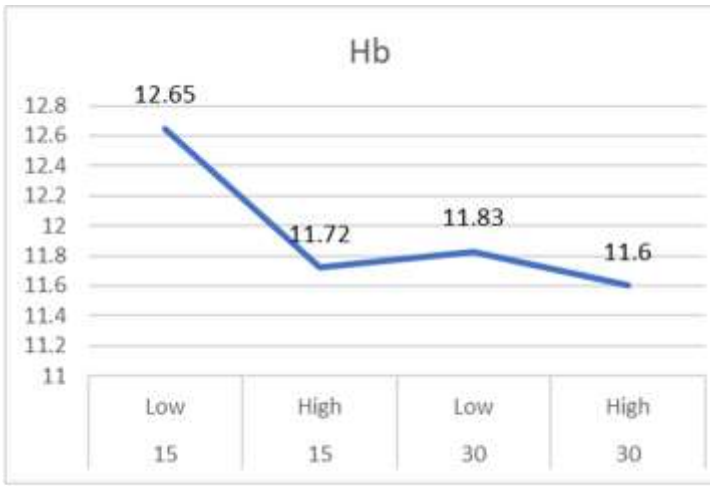
Figure 1: Interaction between levels of SPV and Methionine supplementation on Haematological characteristics of rabbits



(a) Packed Cell Volume



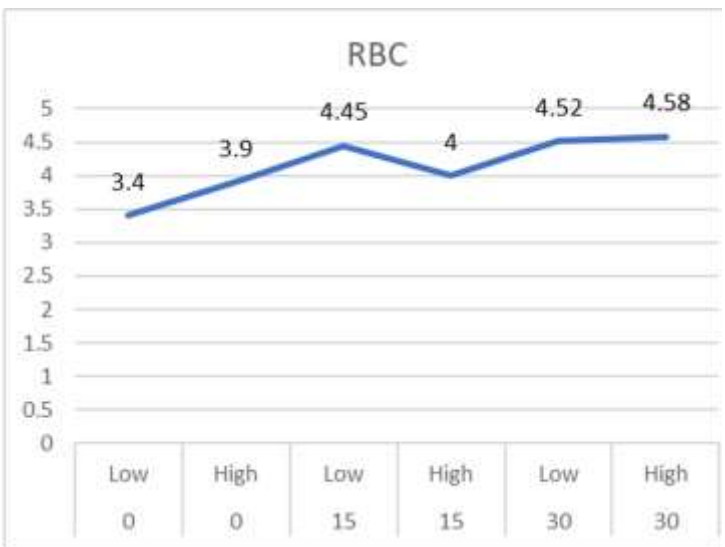
(b) Glucose



c) Haemoglobin

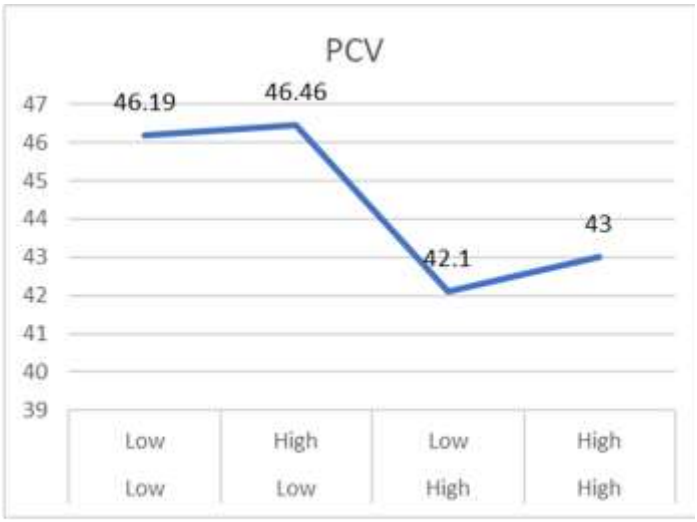


d) White Blood Cell



(e) Red Blood Cell

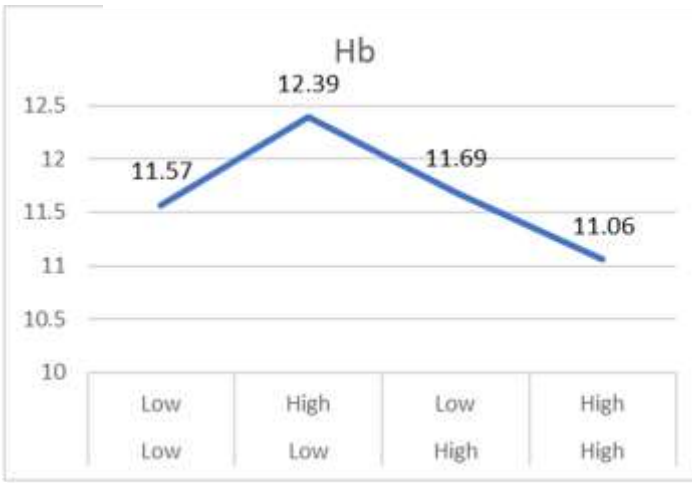
Figure 2: Interaction between levels of SPV and Lysine supplementation on Haematological characteristics of rabbits



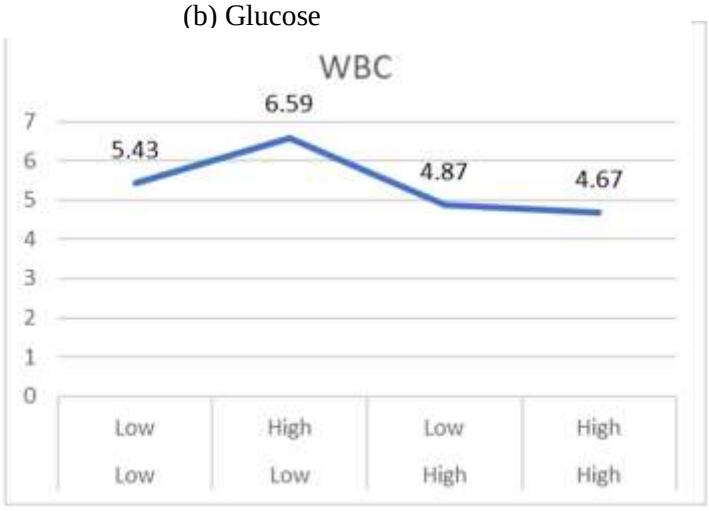
(a) Packed Cell Volume



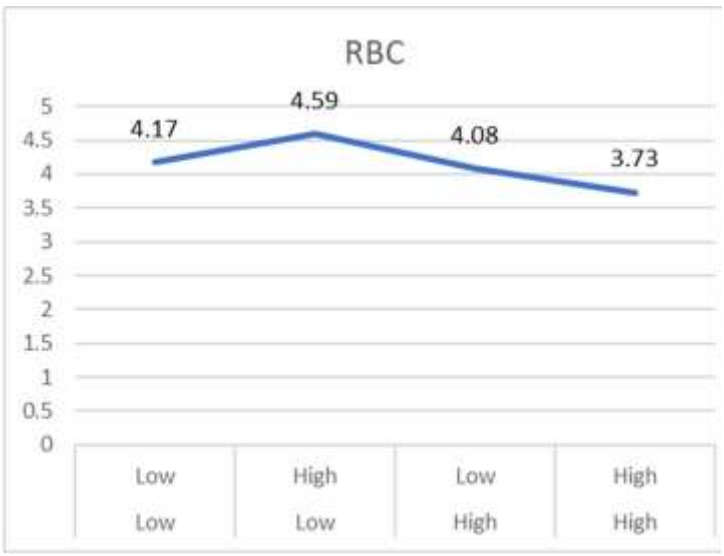
(b) Glucose



c) Haemoglobin

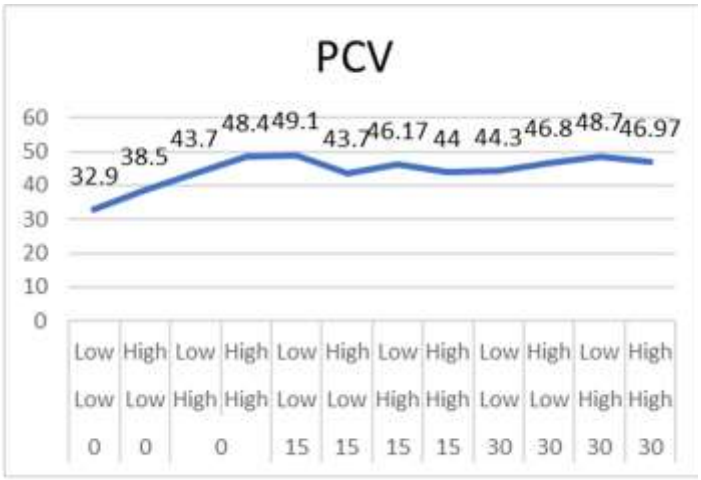


d) White Blood Cell



(e) Red Blood Cell

Figure 3: Interaction between levels of Methionine and Lysine supplementation on Haematological characteristics of rabbits



(a) Packed Cell Volume



(b) Glucose



c) Haemoglobin



d) White Blood Cell



(e) Red Blood Cell

Figure 4: Interaction between levels of SPV, Methionine and Lysine supplementation on Haematological characteristics of rabbits

DISCUSSION

Packed cell volume increased as level of sweet potato vine increased. This could be as a result of sweet potato vine having an effect on haemopoietic tissues. This agrees with Osime *et al*. (2008), who found that there was a significant increase in packed cell volume, white blood cell count and platelet count with sweet potato leaf extract and concluded that sweet potato leaf extract may have a direct effect on haemopoietic tissues. The haemoglobin (Hb) concentration compared favourably with the values of 9.4–17.4 g/dl reported by Fudge (1999) and Njidda *et al.* (2006). All the haematological parameters were within the normal range of 33-50 %, for packed cell volume, 10.4-17.4 g/dl for haemoglobin concentration, 5.50-12.5x10^3 for white blood cell, 5.46 - 7.94 % for red blood cell and 75 - 150 g/dl for glucose level reported by Mitruka and Rawnsley (1977). Thus, the results indicated that the inclusion of sweet potato vine from 0 to 30 % levels and supplementation with methionine and lysine levels did not impose any health challenge to the rabbits.

Methionine had a positive effect on the haematological parameters, as the level of supplementation increased so also the values of the parameters. Lysine equally had a similar effect with methionine on the haematological parameters, except on the haemoglobin concentration, red blood cell count and glucose level. This result agrees with the work of Acar *et al*. (1991) who discovered a non-significant difference in haemoglobin value when lysine was added at high levels in the diet of rabbits. Though, there was no significant difference among the means, thirty percent (30%) sweet potato vine at high methionine level positively increased packed cell volume, white and red blood cells count. Fifteen percent (15%) sweet potato vine at low methionine level had a favourable effect on haemoglobin concentration and glucose level than any other combination. Also, lysine and sweet potato vine interaction increased haematological parameter in this study. Their effect was similar to that of methionine and sweet potato vine combination except that means of glucose level were not different. The values of packed cell volume, haemoglobin concentration, red blood cell count and white blood cell count obtained in this study were comparable to the report of Amao *et al.* (2012), in their study on physiological response of rabbit bucks to prolonged feeding of cotton seed cake-based (CSC) diets supplemented with vitamin E. Amao *et al*. (2012), concluded that prolonged feeding of CSC – based diets to rabbit bucks had adverse effects on blood constituents of the bucks. However, supplementing such diets with 30 mg/kg diet of vitamin E ameliorated the adverse effects.

Thirty percent (30%sweet potato vine and high methionine level positively affected packed cell volume, white and red blood cells count. 15 % sweet potato vine and low methionine level had a favourable effect on haemoglobin concentration and glucose level than any other interaction combination. Also, lysine and sweet potato interaction positively influenced haematological parameter in this study. The interaction between 15 % sweet potato vine, low methionine and low lysine had the highest packed cell volume, haemoglobin concentration, red blood cell count and glucose level.

CONCLUSION

From the results of this study, it is concluded that feeding rabbits with the inclusion of sweet potato vine up to 30 % level as well as supplementing with methionine and lysine did not lead to any deleterious effects on the haematological characteristics of rabbits.

RECOMMENDATION

Recommendation from the result of this study is that sweet potato vine up to 30 % can be included in the diet of rabbits, without supplementation with methionine and lysine as it will not lead to any deleterious effects on their haematological characteristics. Future experiments should compare levels of sweet potato leaves/vine/ forage over the full range of 0 to 100 % in order to verify the above observations.

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