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Theme:

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ANIMAL PRODUCTION:
A KEY TO NATIONAL FOOD SECURITY
AND STABLE ECONOMY**

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A. A. Adeniji, E. A. Olatunji and E. S. Gana**

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EFFECTS OF VARYING LEVELS OF SHEA NUT (*Vitellaria paradoxa*) MEAL ON HAEMATOLOGICAL PARAMETERS OF WEANER RABBITS

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Abstract

A twelve week trial was conducted to investigate the effects of varying levels of shea nut (*Vitellaria paradoxa*) meal on the haematological parameters of weaner rabbits using twenty (20) weaner rabbits of mixed breeds. Five treatment diets designated T₁, T₂, T₃, T₄ and T₅ containing 0%, 10%, 15%, 20% and 25% level of Shea nut (*Vitellaria Paradoxa*) meal respectively were fed daily to the animals which were randomly assigned to five treatment groups of two replicates in a completely randomized design. At the end of the experiment, blood samples were collected early in the morning using an insulin needle into EDTA-coated specimen bottles for laboratory analysis. Parameters determined include total and conjugated bilirubin levels, SGOT, SGPT, alkaline phosphatase, albumin and total protein. The results showed significant (P < 0.05) differences for all the parameters measured with animals fed T₁ diets having the lowest value for all the parameters so determined. It was concluded that animals fed 20% dietary level of shea nut (*Vitellaria Paradoxa*) meal performed better with respect to the parameters so evaluated for.

Introduction

Rabbit production like poultry has the potential of improving animal protein consumption by humans in the developing countries including Nigeria (F.A.O., 1990). The rabbitry business is no doubt one of the most attractive fields of agriculture which is witnessing unprecedented acceptance; this is brought about by increasing and persistent demand for rabbits' products such as meat, pelt or fur. However, there is the need to urgently incorporate non-conventional feed stuff such as novel legumes indigenous to the tropics as proposed by Tuleun and Patrick (2007) in rabbit diet for optimum performance and reduction in cost of production to make rabbit consumption viable and solve the problem of scarce and expensive conventional feed stuff.

One of such legume is Shea nut (*Vitellaria Paradoxa*) seeds which is a good source of oil and may serve as an energy booster in concentrate ration. Shea nut (*Vitellaria paradoxa*) cake however is the by-product of Shea butter extraction. Shea nut (*Vitellaria paradoxa*) is widely distributed in West Africa. Ojebiyi (2007) reported that the nuts are harvested primarily for their fat content, it has good nutritional quality, rich in protein, fat, vitamin, crude fibre and little moisture but very little research has been carried out on the utilization of Shea nut. Animeshaun *et al.*, (2006) observed that nutritional studies should not be limited to performance, carcass quality and nitrogen alone, but the effect on the blood constituent is also very relevant. While Ihedioha and Ibeachu, (2005) have stated that haematology aid the clinician to arrive at a definitive diagnoses of a disease, enable him/her to make a prognosis and also to assess the efficiency of therapy and toxicity of the drugs and chemical substance, Esonu *et al.*, (2001) reported that haematology and serum biochemistry assay of livestock suggest the physiological disposition of animals to their nutrition. It is however known that the sub molecular effects of these alternative feed stuffs are more evident when the blood constituent values are evaluated. The nutritional physiological and pathological status of an organism can be vastly assessed by changes in the constituent components of the blood parameters and have been used to draw clinical inference in clinical investigation and nutritional evaluation of the individual, as nutrients are first available to the blood upon digestion before being utilized in body tissue synthesis. The level of

these blood parameters along with the nutrient retention could be an effective method of evaluating the nutritive value of an ingredient. A depressed growth could be as a result of combination of endogenous losses of essential amino-acid, sulphur containing amino-acid which are important component of trypsin and proteolysis of dietary proteins. Haematological constituent reflect the physiological response of animal to its internal and external environment which include feed and feeding. This study aims to evaluate the effect of varying levels of shea nut meal inclusion on haematological profile of weaner rabbits.

Materials and Methods

The study was carried out at the rabbitry unit of the Ministry of Livestock and Fishery Development, Bosso, Minna. Twenty (20) weaner rabbits aged 4 - 5 weeks old with a mean body weight of 0.79 kg were purchased from a good foundation stock in Minna market. The hutches were disinfected and the environment fumigated before their arrival. The rabbits were raised in spacious and well ventilated hutches which were made of wood, iron and zinc with the walls made of wire mesh to allow ventilation and for the faeces to drop on the ground. The feeders and drinkers were made of metal attached to the hutch to avoid eating of the container and feed wastage. The rabbits were randomly allotted into five (5) treatment groups of two replicate each in completely randomized design (CRD). They were allowed to acclimatize for two weeks during which they were given prophylactic treatment against endo and ecto-parasites. Shea nut (*Vitellaria Paradoxa*) meal were purchased from processors Bida environs. Five treatment diets designated T₁, T₂, T₃, T₄ and T₅ containing 0%, 10%, 15%, 20% and 25% level of Shea nut (*Vitellaria Paradoxa*) meal respectively were formulated and fed to the animals daily throughout the experimental period. The left over were collected, weighed and recorded daily. Normal management practices were employed during the study period. Blood samples were collected at the end of the experiment from two rabbits per treatment using an

insulin needle in specimen bottles with an ethylene diamine tetracetic acid (EDTA) for haematological analysis. Blood parameters analysed for include total protein, glucose, serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvic transaminase (SGPT). Data collected were subjected to Analysis of Variance (ANOVA) using SPSS package (SPSS 16). Means were separated by Duncan's Multiple Range Tests as outline by Steel and Torrie (1980).

Results and Discussion

The proximate composition of shea nut meal used for the experimental diet and the experimental diets are presented in table 1. The results showed the shea nut (*Vitellaria paradoxa*) meal crude protein of 11.55 %, the crude fibre is 48.39 %, ether extracts of 1.3 %, nitrogen free extracts of 35.68 % and ash of 3 %. The results of the proximate analysis of the experimental diet shows that crude protein content varied from 13.25 % in T₁ to 19.25 % in T₂ and Moisture content ranged from 7.65 % in T₁ to 8.98 % in T₂ and T₃, Ether extract content ranged from 18.00 % in T₁ to 24.00 % in T₂, Ash content ranged from 9.03 % in T₁ to 10.30 % in T₂, while Crude fibre content ranged from 11.66 % in T₁ to 16.75 % in T₂. The results of haematological parameter of weaners rabbit fed varying level of shea nut (*Vitellaria paradoxa*) meal is presented in table 2. There were significant ($P < 0.05$) differences among the animals fed the experimental diets with respect to the haematological parameters determined in this study.

According to Animashann *et al.*, (2006) and Ojebiyi, *et al.*, (2007) the use of haematological studies is very important in considering the health status of animals used in various feed trials. Olorode *et al.*, (1995) have reiterated that nutrition interferes with the myriads of metabolites and other constituent found in the blood.

In this study, it was observed that the level of total bilirubin, conjugated bilirubin, Alkaline Phosphatase, SGOT, Total protein and Albumin differed significantly ($P < 0.05$) among the treatment groups with animals fed diets T₂ (10 % Shea nut meal) and T₃ (15 % Shea nut meal) diets recording higher levels of total bilirubin, conjugated bilirubin, Alkaline phosphatase, SGOT and SGPT than the other groups fed 0 % Shea nut meal (T₁ diets), 20 % Shea nut meal (T₄ diets) and 25 % Shea nut meal (T₅ diets). This finding agreed with that of Ekpeyong and Biobaku (1986), and Banerjee (1998) who observed similar trend for the aforementioned parameters in a similar study. The authors reported that, under normal circumstances the values of SGOT and SGPT in particular are low in the blood, but may become high when the plane of nutrition is low or when there is an occurrence of liver damage which may be further aggravated by the occurrence of diseases like coccidiosis, bloat, diarrhea, pasteurellosis, etc. which were all recorded in this study.

The level recorded for total protein increased as the level of shea nut meal in diet increased. This was a reflection of the proportion of dietary protein level and may portray the health status of the animal. (Babayemi *et al.*, 2003). The level of albumin in the blood was higher in rabbits fed 15 % Shea nut meal (T₃ diets), however animals fed T₄ diets (20 % Shea nut meal)

recorded the least value in most of the parameters measured. According to Miller *et al.*, (1971), albumin tend to remain constant throughout the life of an animal reaching a maximum level at about three weeks of age but may become detrimental to the liver if a decrease/decline occur and vice versa.

Conclusion and Recommendation

It was observed that the experimental diet had an effect on the performance of the rabbits as demonstrated by the result obtained. With the exception of blood albumin and total protein, all other haematological parameters evaluated were high in the treatment groups. It is recommended that under good management, shea nut (*Vitellaria paradoxa*) meal may be included in diet of rabbit up to 20%.

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Table 1: Composition of Shea nut (*Vitellaria paradoxa*) meal and experimental diets

Components	T1	T2	Experimented diets			Shea nut meal
			T3	T4	T5	
Crude protein (%)	13.25	14.08	18.64	19.03	19.25	11.55
Moisture (%)	8.57	8.98	8.98	8.66	7.65	1.21
Ether extract (%)	24.00	23.00	17.00	17.90	18.00	1.38
Ash (%)	9.03	9.62	8.00	8.49	10.30	3.00
Crude fibre (%)	11.66	10.25	19.04	18.29	16.75	48.39
Nitrogen free extract	33.49	34.07	28.34	27.63	28.05	34.47

T₁ - 0 % Shea nut (*Vitellaria paradoxa*) meal
 T₂ - 10 % Shea nut (*Vitellaria paradoxa*) meal
 T₃ - 15 % Shea nut (*Vitellaria paradoxa*) meal
 T₄ - 20 % Shea nut (*Vitellaria paradoxa*) meal
 T₅ - 25 % Shea nut (*Vitellaria paradoxa*) meal.

Table 3: Haematological parameters of weaner fed varying levels of Shea nut (*Vitellaria paradoxa*) meal

Parameters	Experimental Diets					SEM	LS
	T1	T2	T3	T4	T5		
Total Bilirubin Level (mmol/L)	28.38 ^b	44.11 ^a	43.46 ^a	27.01 ^c	32.83 ^{ab}	3.31	*
Conjugated bilirubin (mmol/L)	14.19 ^b	22.05 ^a	21.74 ^a	13.50 ^c	16.41 ^{ab}	1.65	*
Alkaline Phosphatase (i.u/L)	9.43 ^{ab}	12.98 ^a	12.98 ^a	7.19 ^b	10.73 ^{ab}	0.82	*
SGOT (i.u/L)	4.41 ^d	12.54 ^c	21.99 ^b	27.40 ^a	18.72 ^{cd}	3.98	*
SGPT (i.u/L)	19.79 ^{bc}	38.00 ^a	28.88 ^{ab}	10.60 ^c	30.05 ^{ab}	5.17	*
Total Protein (g/dl)	5.37 ^b	6.37 ^{ab}	6.15 ^{ab}	6.78 ^{ab}	7.28 ^a	0.26	*
Albumin (g/dl)	5.95 ^{abc}	6.79 ^{ab}	7.04 ^a	5.30 ^c	5.76 ^{bc}	0.24	*

a,b,c,d mean with different subscript on the same row are significantly (P < 0.05) different.

SEM= Standard Error of Means

LS = Level of significance

SGOT=Serum glutamate oxaloacetate transaminase

SGPT= Serum glutamate pyruvic transaminase,

T₁ - 0 % Shea nut (*Vitellaria paradoxa*) meal
 T₂ - 10 % Shea nut (*Vitellaria paradoxa*) meal
 T₃ - 15 % Shea nut (*Vitellaria paradoxa*) meal
 T₄ - 20 % Shea nut (*Vitellaria paradoxa*) meal
 T₅ - 25 % Shea nut (*Vitellaria paradoxa*) meal



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