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PERFORMANCE OF GROWING RABBITS FED DIETS CONTAINING DIFFERENT PROTEIN SOURCES

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Abstract

The aim of the study was to determine the performance, carcass traits, haematology and biochemical parameters of weaner rabbits fed different plant protein sources. The feeding trial was conducted with fifty (50) weaner rabbits obtain from VOM, Plateau State. The rabbits were randomly allotted to the experimental diets. The weaner rabbits were managed intensively. Water and feeds were given *ad libitum*. Drugs were also administered and deworming done appropriately. The experiment lasted for a period of eight weeks. The rabbits were fed diets containing five different plant protein sources (soybean, ground nut cake, sesame, pigeon pea and bambara nut) designated as T1, T2, T3, T4 and T5 respectively. All the performance variables recorded in this study were not significantly affected by the different plant protein sources except for daily feed intake. Most of the carcass traits showed significant treatment effects except for organs such as heart, kidney, head, feet, tail, shoulder and thigh. The haematological indices also showed no significant differences across dietary treatments. All the parameters analysed for biochemical indices showed no significant differences across the dietary treatments except for cholesterol.

Key words: rabbits, protein, performance, diets, sources

Introduction

Rabbit production in Nigeria is practiced mainly in the rural areas under traditional management systems with forage-based diets as the principal feed resources. The poor and unbalanced quality of grasses is a major constraint, which limits the successful production of rabbits. Cheeke and Raharjo (1988) concluded from a review of rabbit production on tropical feed resources that tropical grasses were unsuitable as the sole feed for rabbits due to their low digestibility (less than 10%). However rabbits can successfully be raised on diets that are low in grains and high in roughage (Cheeke 1986). Growing rabbits can be maintained satisfactorily on diets consisting of 100 to 200g green roughage and 40 to 60g concentrate mixtures for maximum production (Ranjhan 1980).

Adequate supplementation remains a principal hurdle to be overcome for rabbit rearing in Nigeria. Supplementary concentrates are based on mixtures of locally available protein feedstuffs (groundnut cake, soybean cake, beneseed, bambara nut, etc) and energy (wheat bran, rice bran, maize). Concentrates are presented either as commercial mixtures or homemade feeds. The high cost of commercial feeds and the irregular supply of protein feedstuffs for compounding home-made feeds by farmers confounds with other constraints to complicate the nutritional adequacy of diets for rabbits. Rabbit farmers practice the inclusion of multiple protein-rich feedstuffs as sources of protein in their home-made concentrate feeds. This practice does not only have an increased effect on the cost, but leaves the farmers with limited options in the manipulation of feed formulae in the absence of some of these feedstuffs on the market. The use of soybean meal as the sole source of supplementary protein has been suggested (Rahin *et al* 1997). Other authors (Roy *et al.*, 2002) reported the effects of supplementation with different sources of protein (Soybean meal, groundnut cake, bambara nut) on growth and reproductive performance of rabbits. Information is limited in the literature on the response of growing rabbits to concentrate



supplementary feeds containing different sources of protein, and their combinations and, in particular, the economic benefits associated with these dietary supplements for rabbits in tropical environments.

Materials and Methods

The study was conducted in Jos, Plateau state. The feeding trial was conducted with fifty (50) weaner rabbits obtained from VOM, Plateau State. The rabbits were randomly allotted to the experimental diets. The weaner rabbits were managed intensively. Water and feeds were given *ad libitum*. Drugs were also administered and deworming done appropriately. Different treatments contained different sources of protein. Soyabean, Groundnut cake, sesame, pigeon pea and bambara nut were the major sources of protein in treatment 1, 2, 3, 4 and 5 respectively. Blood samples were collected during the last week of experiment from each treatment for the determination of hematological indices. Five (5) millimeter (ml) of blood was collected from each rabbit into sample bottles containing ethylene diamine tetra acetic acid (EDTA) as anticoagulant. The hematological indices determined include packed cell volume (PCV), hemoglobin concentration (Hb), Red blood cell (RBC) and white blood cell (WBC) using the procedure described by Dacie and Lewis (2001). At the end of the experiment, two rabbits were randomly selected from each treatment to evaluate their carcass parameters. The rabbits were weighed before slaughter and the weight recorded as live weight. Thereafter, they were cut into various parts to get various organs weight including internal organs. Data generated during the experiment were subjected to Analysis of Variance (ANOVA) technique as outlined by Steel and Torrie (1990). The treatment means were separated by Duncan's new multiple range test (Duncan, 1995).

Results and Discussion

Table 1: Performance of weaner rabbits fed different plant protein sources

Parameters	T1 SBM	Dietary T2 GNC	Treatments T3 Sesame	T4 P/PEA	T5 B/NUT	SEM	LOS
Initial weight (g)	277.89	278.67	278.83	278.83	277.89	14.99	NS
Final live weight (g)	1098.50	1105.30	1044.30	1002.20	988.80	22.27	NS
Daily feed intake (g)	50.81 ^{ab}	54.56 ^a	49.65 ^{bc}	46.14 ^c	46.11 ^c	0.82	*
Daily weight gain (g)	14.80	14.98	13.88	12.67	12.64	0.32	NS
Feed conversion ratio	3.42	3.28	3.79	3.98	24.00	0.06	NS

^{abc}: Means within the same row bearing different superscripts are significantly different ($P < 0.05$); LOS- Level of significance- NS- Non significant difference; SBM- Soybean meal; GNC- Groundnut cake; P/PEA- Pigeon pea; B/NUT- Bambara nut

Table 2: Hematological indices of rabbits fed different plant protein sources

Parameters	T1 SBM	T2 GNC	T3 Sesame	T4 P/PEA	T5 B/NUT	SEM	LOS	Reference range
Packed cell volume (%)	33.00	37.67	37.55	33.00	36.23	1.56	NS	30 – 50
Haemoglobin (g/100ml)	10.03	10.34	9.72	10.00	9.73	0.18	NS	10 – 15
Red blood cell ($\times 10^6/\text{mm}^3$)	3.52	3.99	4.61	4.50	3.95	0.32	NS	5-8



White blood cell ($\times 10^3/\text{mm}^3$)	5.73	8.75	8.30	6.55	7.18	0.94	NS	4.5 – 11
Mean corpuscular volume (fl)	93.67	94.33	71.54	94.25	92.65	7.49	NS	78-95
Mean corpuscular haemoglobin concentration (g/dl)	30.39	27.45	29.46	29.55	30.76	0.87	NS	30 – 35
Mean corpuscular haemoglobin (pg)	28.46	25.89	21.08	22.50	22.04	2.17	NS	19 – 22

LOS- Level of significance- NS- Non significant difference; SBM- Soybean meal; GNC- Groundnut cake; P/PEA- Pigeon pea; B/NUT- Bambara nut

Table 3: Biochemical indices of rabbits fed different plant protein sources

Parameters	T1 SBM	T2 GNC	T3 Sesame	T4 P/PEA	T5 B/NUT	SEM	LOS	Reference range
Blood urea (mmol/l)	4.63	4.64	3.76	3.84	3.54	0.29	NS	
Total protein (g/dl)	6.10	6.10	6.05	6.01	6.00	0.03	NS	5.4 – 7.5
Cholesterol (mol/l)	162.00 ^b	155.05 ^c	199.11 ^a	100.11 ^c	87.76 ^c	2.06	*	
Albumin (g/dl)	3.67	3.46	3.27	3.17	3.11	0.12	NS	2.43 – 4.5
Creatinine (mg/dl)	1.67	1.66	1.63	1.61	1.60	0.01	NS	0.5 – 2.2
AST (U/L)	45.57	45.34	45.57	45.55	45.78	4.77	NS	35 – 130
ALT (U/L)	55.33	44.90	44.98	49.79	55.57	3.52	NS	45 – 80
ALP (U/L)	202.00	182.67	198.50	201.55	218.57	10.37	NS	

^{abc}: Means within the same row bearing different superscripts are significantly different ($P < 0.05$); LOS- Level of significance- NS- Non significant difference; SBM- Soybean meal; GNC- Groundnut cake; P/PEA- Pigeon pea; B/NUT- Bambara nut

Table 4: Carcass traits of weaner rabbits fed different plant protein sources

Parameters	T1 SBM	T2 GNC	T3 Sesame	T4 P/PEA	T5 B/NUT	SEM	LOS
Pre-slaughter weight	1098.50	1105.30	1044.30	1002.20	988.80	22.27	*
Carcass weight	963.07 ^a	989.63 ^a	959.10 ^b	899.54 ^{bc}	775.98 ^c	10.15	*
Dressing percentage	65.95 ^a	66.70 ^a	65.85 ^a	64.77 ^a	57.68 ^c	0.43	*
Heart	0.28	0.27	0.27	0.31	0.29	0.01	NS
Lung	0.76	0.77	0.72	0.79	0.70	0.02	NS
Liver	3.26 ^c	3.81 ^{ab}	3.22 ^c	4.37 ^a	3.62 ^b	0.07	*
Kidney	0.96	1.02	1.14	1.18	1.17	0.03	NS
Stomach	1.99 ^a	1.72 ^a	1.40 ^b	1.78 ^a	1.22 ^b	0.03	*
Intestine	15.29 ^c	19.56 ^b	20.00 ^{ab}	21.90 ^a	19.50 ^b	0.40	*
Head	12.13	11.77	11.08	12.33	11.56	0.25	NS
Skin	10.96 ^{ab}	12.74 ^a	10.73 ^{ab}	12.59 ^a	11.55 ^{ab}	0.25	*
Feet	2.62	2.65	2.62	3.13	2.59	0.10	NS
Tail	1.16	1.26	1.08	1.06	1.25	0.03	NS
Shoulder	25.66	23.90	26.99	27.42	25.66	0.31	NS
Loin	21.45 ^a	27.78 ^a	20.41 ^{ab}	17.37 ^c	19.86 ^{ab}	0.34	*



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Thigh	26.02	29.65	23.44	24.91	26.01	0.64	NS
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^{abc}: Means within the same row bearing different superscripts are significantly different ($P < 0.05$); LOS- Level of significance- NS- Non significant difference; SBM- Soybean meal; GNC- Groundnut cake; P/PEA- Pigeon pea; B/NUT- Bambara nut

The daily feed intake was significantly higher ($P < 0.05$) in T2 (Ground nut cake) than those fed T1 (soybean meal) and T3 (sesame meal) but similar to T5 (bambara nut) group. The values obtained in this study were similar to the values of 44.82 to 65.4g reported by Onimisi *et al.* (2016) who fed graded levels of poultry litter in the diets of growing rabbits. This study revealed that all experimental diets had no significant effect on the hematology of experimental rabbits. This is an indication that neither of soybean meal, ground nut cake, sesame, pigeon pea and bambara nut had any negative impact on the haemopoietic centers of rabbit. Nevertheless, the red blood cells in all treatments fell below the normal range as reported by Merck Sharp and Dohme (2011). This may be due to incidence of mange encountered in all the animals at the early stage of the experiment. The result also suggests that normal protein metabolism occurred in rabbits, since protein synthesis is related to the amount of protein available in the diet (Iyayi and Tewe, 20188). The result obtained in this study is similar to the report of Jamroz *et al.* (1996) who observed increased dressing percentage when broiler chickens were fed vegetable based diets.

Conclusion and Recommendations

It was concluded that, rabbits fed different plant protein sources had no adverse effects on growth performance. Feeding rabbits with T2 (groundnut cake) diet had better performance indices compared to other diets. Feeding the rabbits with the five different protein sources had no adverse effect on the haematological parameters of the rabbits.

Diet 2 (ground nut cake) gave the best result It is therefore recommended for use in weaner rabbits diets. It is also recommended that farmers can supplement basal diets with either of these plant protein sources for rabbits. These plant protein sources have been identified as good sources of protein for rabbits that could be used alongside other well-known protein sources especially from animal origin for rabbits

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