COMPARATIVE EFFECT OF A COMMERCIAL GROWTH PROMOTER AND TWO PHYTO-ADDITIVES ON PERFOMANCE AND HAEMATOLOGICAL PARAMETERS OF GROWING RABBITS

OJEBIYI, O.O., FATOKI, H. O., ABIOYE, M. A., OLADAPE, A. P., OLOSUNDE, T. D., AND ADEGBITE, F. M.

Department of Animal Nutrition and Biotechnology, Ladoke Akintola University of Technology, P.M.B 4000, Ogbomoso, Oyo State, Nigeria.

*Email of corresponding Author: segunojebiyi@gmail.com,

Abstract

Commercial growth promoters, such as antibiotics and hormones, are used to enhance growth rates and improve feed efficiency in rabbits. However, concerns about antibiotic resistance, residue accumulation, and potential health risks have led to increase interest in alternative growth promoters like phyto-additives. This study investigated the effects of a commercial growth promoter (Nufocare) and two phyto-additives (breadfruit leaf and breadnut leaf) on the performance and blood profile of growing rabbits. Thirty (30) growing rabbits of mixed breed and mix sexes were used for the experiment. The animals were weighed and distributed into five (5) dietary treatments of six (6) rabbits each, with each rabbit serving as a replicate in a Completely Randomized Design, which lasted nine weeks. The experimental design consisted of Diet 1 (T1): Control diet, Diet 2: Control diet plus Nufocare (1g/1kg of feed), Diet 3: Control diet plus breadfruit leaf (6g/1kg of feed), Diet 4: Control diet plus breadnut leaf (6g/1kg of feed), Diet 5: Control diet plus combination of breadfruit leaf (3g) and breadnut leaf (3g) (T5). The data collected on performance characteristics and haematological parameters were analyzed using one way analysis of variance. Results showed that dietary treatments has no significant effect on the final live weight of the rabbits, daily feed intake was significantly lower ($P<0.05$) in rabbits fed diet containing phyto-additive (T3–T5). Feed-to-gain ratios were more favourable in T2 (8.34) and T5 (8.89), compared to the control diet (10.62), indicating improved feed efficiency with the use of Nufocare and combination of breadnut and breadfruit leaves meal. However, combination of breadfruit and breadnut leaf had the highest white blood cell count (WBC), which could indicate a possible enhancement in immune response. These findings suggest that phyto-additives could be viable alternatives to commercial growth promoters in rabbit production.

Keywords: Growth performance, Haematological parameters, Nufocare, Breadnut leaf, Breadfruit leaf

Description of Problem

The world faces major challenges of eradicating poverty and feeding the growing population with nutritious, low-cholesterol protein to combat malnutrition [14]. Increasing livestock production, especially small animals, such as rabbits is a key solution to boost income and animal protein supply particularly in Nigeria [9]. Rabbit has immense potentials and good attributes which include high growth rate, high efficiency in converting forage to meat, short gestation period and high prolificacy, relatively low cost of production [1].

In intensive rabbit production, antibiotics are often added to rabbits' feed or water in order to prevent enteric diseases as well as improving it growth performance [5]. The search for alternative to antibiotics has received considerable attention and some plants rich in antioxidant like rosemary have been shown to improve overall health and productivity in rabbits [8]. Phytogenic feed additives such as *Moringa oleifera* have been linked to higher haemoglobin levels, suggesting better iron metabolism and erythropoiesis [6]. The use of breadnut leaf (*Artocarpus camansi*) as a phyto-additive in rabbit production is gaining attention for its health and growth benefits, as it is rich in nutrients, antioxidants, and fibre that enhance feed quality, gut health, and immune function [2]. Khan [11] also documented that breadfruit leaves (*Artocarpus altilis*) are rich in fibre, protein, and essential nutrients which could enhance rabbit diet quality. Therefore, this study was designed to examine the response of growing rabbits to commercial growth promoter and two different phyto-additives.

Materials and Methods

Experimental site: The experiment was carried out at the Rabbit Production and Research Unit, Teaching and Research Farm of the Ladoke Akintola University of Technology, Ogbomoso, Nigeria.

Experimental Animals and Management: Thirty (30) growing rabbits of mixed breed and sexes were used for the experiment. The animal were weighed and randomly divided into five (5) dietary treatments of six (6) rabbits, each rabbit served as a replicate. Feed that met the growing rabbit requirements (Table 1) was formulated and fed throughout the experimental period of nine (9) week Daily rations were offered twice daily using earthen pot feeders and clean water was served..

Table 1: Gross Composition of Experimental Diet

Ingredients (kg)	T1	T2	T3	T4	T5
Maize	22.00	22.00	22.00	22.00	22.00
Soyabean meal	20.00	20.00	20.00	20.00	19.50
Corn bran	15.00	15.00	15.00	15.00	15.00
Corn cobs	6.00	6.00	6.00	6.00	6.00
Rice husk	11.00	11.00	11.00	11.00	11.00
Wheat offal	11.00	11.00	11.00	11.00	11.00
Palm kernel cake	12.00	12.00	12.00	12.00	12.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Commercial Growth Promoter	-	+	-	-	-
Breadfruit leaf meal	-	-	+	-	+
Breadnut leaf meal	-	-	-	+	+
Cost/kg (₦)	618.54	624.04	623.04	623.04	623.04

M.E: Metabolizable Energy, +: inclusion of Test ingredients, - : no inclusion of Test ingredients

Profile of Test Ingredients

Commercial growth promoter and acidifier (Nufocare powder) with recommended dosage of 0.5 – 1.5kg/metric ton of feed was purchased from the sole distributor. The bread fruit and bread nut leaves were harvested from papa Abede, Ogbomoso, Oyo State. The leaves were cut into pieces, air-dried till uniform dried weight was obtained after which the dried leaves where milled.

Experimental layout

Diet 1: Control diet, Diet 2: Control diet + Nufocare powder (1g/1kg of feed), Diet 3: Control diet + Breadfruit leaf meal (6g/1kg of feed), Diet 4: Control diet + Breadnut leaf meal (6g/1kg of feed), Diet 5: Control diet + Bread fruit leaf (3g) + Bread nut leaf (3g)/kg of feed

Data collection

Performance characteristics

Growth parameters taken include the feed intake, weight changes and feed conversion ratio. Initial body weight (g) of the rabbits were taken on arrival with the use of a sensitive scale. Feed intake was calculated on daily basis as the difference between the feed offered and the left over. The difference in weight between the two was the quantity of feed consumed per day. Mean weight gain was calculated by deducting initial weight from the final weight (g).

Feed to Gain = Total Feed intake ÷ Total Weight gained while the

Feed cost per kilogram weight gain = cost of feed per kilogram x feed to gain ratio

Haematological parameters: A 5ml of blood sample was drawn using new sterilized syringe and needle into test tubes containing the anticoagulant, EDTA for the assessment of haematological parameters. This was analyzed using sysmex KX-21N (Automated hematological Analyzer). All the data collected was subjected to one way Analysis of Variance using General Linear Model Procedure (GLM) of [16] software package.

Results and Discussion

The performance of rabbits is presented in Table 2. The results showed significant ($p<0.05$) differences in the parameters measured except final weight gain, daily weight gain and feed cost/kg of feed. The significant difference observed in daily feed intake ($p<0.05$) indicate that phytogenic additives (T3–T5) reduced voluntary feed intake compared to the control diet. Reduced feed intake with leaf meals may be due to the phytochemical composition of plant additives that can affect palatability [15]. The result of this study also supports the findings of Bento *et al*. [3] that ginger powder as phyto-additives help in improving growth performance. However, the reduction in feed intake recorded negate the report of Jamroz *et al*. [10] and Bento *et al*. [3] who documented increase in feed intake of growing rabbits fed phyto-additives. Nufocare-fed rabbits (T2) and phytoadditives (breadnut+breadfruit leaves meal) fed rabbits (T5) had similar lower feed conversion efficiency of 8.34 and 8.89 respectively, with the highest FCR obtained in rabbit fed control diet. This result corroborate the findings of Buba *et al*. [4] who documented lowest FCR (2.79) in rabbit fed scent (*Ocimum gratissimum*) leaf as phyto-additives with highest FCR in control diet. Improved FCR observed in the breadnut and breadfruit leaves meal treated groups could be attributed to their positive effects on nutrient digestibility as reported by Hernandez *et al*. [7].

Table 2: Effect of Commercial growth promoter and two different phytoadditives on Performance of growing rabbit

Parameters	T1	T2	T3	T4	T5	SEM	P-value
Initial weight (g)	1022.33	1028.83	1051.50	1030.83	1022.33	78.02	0.99
Final weight (g)	1901.17	2098.50	2010.00	1905.83	2030.33	82.50	0.27
Daily weight gain (g)	13.52	16.46	14.75	13.46	15.51	1.83	0.56
Daily feed intake (g)	143.57^{a}	143.73^{b}	135.56^{c}	136.32^{c}	134.47^{c}	1.61	0.01
Feed: Gain	10.62^{a}	8.34^{c}	9.19^{b}	10.13^{a}	8.89^{c}	1.74	0.04
Feed cost/kg (₦)	618.54	624.04	623.04	623.04	623.04	0.00	0.00
Feed cost/kg/wg (₦)	6568.90^{a}	5204.50^{c}	5725.74^{c}	6311.40^{b}	5538.83^{c}	1077.5	0.04

^{abc}Means within each row with different superscripts are significantly different ($p<0.05$)

Table 3 shows the effect of commercial growth promoter and two different phytoadditives on haematology of growing rabbits. Significant differences were observed in haemoglobin (HB), red blood cells (RBC), mean corpuscular volume (MCV), and platelet count ($p<0.05$). Rabbits on the control diet (T1) had the highest haemoglobin and RBC, while breadnut leaf (T4) had the lowest. This suggests that breadnut leaf might not effectively support erythropoiesis, possibly due to the presence of anti-nutritional factors such as tannins or low bioavailable iron, as documented by [12]. The highest MCV was observed in T4 and T5, potentially indicating macrocytic changes due to B-vitamin or folate deficiencies from phytochemical interference, as suggested by [13]. Platelet count was highest in Nufocare (T2), reflecting improved thrombopoiesis and circulatory stability.

Table 3: Effects of commercial growth promoter and two different phyto-additives on haematology of growing rabbits.

Parameters	T1	T2	T3	T4	T5	SEM	P-value
PCV (%)	45.00	41.67	43.00	39.00	41.67	5.43	0.21
HB(g/dL)	156.33^{a}	147.67^{b}	149.00^{b}	137.00^{c}	147.67^{b}	3.10	0.02
RBC x (10^{12}/L)	7.00^{a}	6.98^{b}	7.07^{a}	6.29^{c}	6.73^{b}	0.19	0.04
MCV (fL)	61.00^{b}	59.00^{c}	60.33^{b}	62.00^{a}	62.00^{a}	0.69	0.04
MCH(Pg)	21.67	21.00	21.00	22.00	22.00	0.29	0.08
MCHC(g/L)	352.33	354.33	350.33	354.00	357.00	4.01	0.81
WBC x (10^{9}/L)	8.33	11.67	8.33	11.00	14.00	2.02	0.29
N (%)	27.00^{c}	44.00^{b}	36.33^{b}	47.67^{a}	53.00^{a}	5.63	0.04
L (%)	69.00^{a}	50.33^{b}	57.00^{b}	45.67^{c}	41.67^{c}	5.43	0.03
M (%)	3.67^{c}	5.00^{b}	6.33^{a}	7.00^{a}	5.67^{b}	0.37	0.01
B (%)	0.33	0.33	0.00	0.00	0.00	0.21	0.58

PLT x (10^9/L)	119.67^c	310.00^a	197.00^b	171.00^b	186.00^b	52.92	0.02

^{abc} Means on the same row with different superscripts are significantly different ($p<0.05$), PCV= Pack cell volume, HB= Haemoglobin, RBC= Red blood cell, MCV= Mean corpuscular volume, MCH= Mean corpuscular haemoglobin, MCHC= Mean corpuscular haemoglobin concentration, WBC= White blood cell, N= Neutrophils, L= Lymphocytes, M= Monocytes, B= Basophils, PLT= Platelet.

Conclusion and Application

It may be concluded that phytoadditives can improve the performance and blood profile of growing rabbits. The results suggest that breadnut leaf at 3g/kg feed and breadfruit leaf at 3g/kg feed can be used as a viable alternative to commercial growth promoters in rabbit production

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