

GROWTH PERFORMANCE AND HAEMATOLOGICAL PROFILE OF WEANER RABBITS FED DIETS SUPPLEMENTED WITH THYME (*Thymus vulgaris* L.) and TURMERIC (*Curcuma longa*)

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ABSTRACT

The study was conducted to determine the growth and haematological responses of weaner rabbits to varying dietary levels supplemented with *Thymus vulgaris* L. and *Curcuma longa*. A total of thirty six (36) unsexed weaner rabbits with average age of 4 weeks (28 days) and average weight of 750g were randomly assigned to four dietary treatments with 9 animals per treatment. Each treatment was replicated three times with 3 animals per replicate in a completely Randomized Design. Treatment 1 (T1) control contained 0g of turmeric and thyme, T2 contained 16g thyme/kg feed, T3 contained 16g turmeric/kg feed and T4 contained 8g thyme +8g turmeric/kg feed. Feed and water were provided *ad libitum* to the rabbits. Body weight and feed intake were measured weekly. The experiment lasted for 10 weeks. At the end of the experiment blood was collected for haematological analysis. The results showed that rabbits on T4 showed improved performance in final body weight (1900g), total weight gain (1073.33g), average daily weight gain (19.17g), and feed conversion ratio (3.96). There were significant ($p < 0.05$) differences among the treatments means on packed cell volume (PCV), while, no significant ($p > 0.05$) differences occurred on RBC, WBC, Hb, MCHC, MCH, MCV and neutrophils, but, were within the normal range of values for rabbits. Rabbits on treatment 4 had the best PCV (44%). It was therefore, concluded that the inclusion of thyme at 8g/kg + turmeric at 8g/kg of feed in the diet of rabbits improved their growth performance and boosted their PCV values.

Keywords: Weaner rabbits, turmeric, thyme, growth performance, heamatological profile.

INTRODUCTION

Since plant protein only cannot supply the protein requirement of man, supplementation is needed from animal protein which will require an increase in livestock production (Coles *et al.*, 2016). The search for alternative sources of protein in order to meet the requirement per capita has led to increased rabbit production due to the potentials in cuniculture such as high prolificacy, low cost of production, high efficiency in the conversion of forage to meat, short gestation interval, high growth rate, low cholesterol and fat content (Severin *et al.*, 2022). As more farmers venture into rabbit production, feeding according to Cherwon *et al.*, (2020) has become one major problem over the years. In as much as rabbits have the ability to convert forages of little or no use to humans to high value animal protein, proper feeding must be put in place to achieve the goal. Optimum performance and prolificacy in rabbits can be achieved through proper feeding (Cherwon *et al.*, (2020).

Feed additives are an important component of feeds that help animals perform better and produce more (Földešiová *et al.*, 2015). Supplementation of growth promoters or feed additives from different sources to rabbit diets is common and widely used in order to improve the utilization of nutrients (AbdelWareth *et al.*, 2014; Földešiová *et al.*, 2015). Thyme and turmeric are among some of the forages that can be used to mitigate against the effect of heat stress and improve nutrient digestibility in animals (Mehdipour and Gharachorloo, 2020). Over the years, thyme (*Thymus vulgaris*) and turmeric (*Curcuma longa*) have been used as supplement or feed additives in the production of livestock as these can serve as antibiotics, antimicrobial and antioxidants to improve the health of the animal, but there are limited information on their use in rabbit production. Hence, the aim of this study was to evaluate the growth performance and haematological profile of rabbits fed diets containing thyme and turmeric.

MATERIALS AND METHOD

Experimental area

The experiment was conducted at the Rabbitry Unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria Nsukka, Enugu state.

Experimental Animals and Management

A total of thirty six (36) unsexed weaner rabbits with average age of 4 weeks (28 days) and average weight of 750g were used for the experiment. The rabbits were randomly assigned to four dietary treatments (T1, T2, T3 and T4) with 9 animals per treatment. Each treatment was replicated three times with 3 animals per replicate in a completely Randomized Design (CRD). Treatment 1 (T1) control contained the basal diet with 0g of turmeric and thyme, T2 contained the basal diet with 16g thyme/kg feed, T3 contained the basal diet 16g turmeric/kg feed and T4 contained the basal diet with 8g thyme +8g turmeric/kg feed. Feed and water were provided *ad libitum* to the rabbits. Body weight and feed intake were measured weekly. The experiment lasted for 10 weeks. At the end of the experiment blood was collected for haematological analysis. Feed and water were provided *ad libitum* to the rabbits. Proximate analysis was carried out to determine the nutritional composition of the feed (Supreme Feed Nigeria Ltd) and test ingredients and the results are presented in Table 1.

Table 1: Proximate Analysis of Feed and Test ingredients

Sample	M.C (%)	Ash (%)	C.P (%)	Crude fiber (%)	Ether Extract (%)	NFE (%)
Feed	14.50	6.00	21.70	2.50	3.00	52.30
Thyme	7.00	3.00	12.92	10.00	0.50	66.58
Turmeric	8.92	2.85	9.42	4.60	6.85	67.36

MC = Moisture content, CP = Crude protein, NFE = Nitrogen free extract

Data Analysis

Data collected were subjected to one-way analysis of variance (ANOVA) using SPSS 11.0 computer statistical package in accordance with a Completely Randomized Design (CRD). Significant means were separated using the Duncan multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Growth Performance

The results of the growth performance of weaner rabbits fed diets supplemented with thyme and turmeric are presented in Table 2. The result showed that there were significant ($p < 0.05$) effects on the final body weight (FBW), total weight gain (TWG), average daily weight gain (ADWG) and the feed conversion ratio (FCR), while there were no significant ($p > 0.05$) effects on the total feed intake (TFI) and the average daily feed intake (ADFI). Rabbits on T4 had the highest performance values on FBW, TWG, ADWG, and FCR. This could be attributed to the effect of thyme and turmeric. Ahmed *et al.* (2020) in a survey reported that as quantity of thyme increased in the rabbits' diet, there was an increase in the growth performance of the rabbits.

Table 2: Growth performance of weaner rabbits fed diet supplemented with thyme and turmeric (Mean±SE)

Parameters	Treatments				P-Value
	T1 (0g thyme and turmeric)	T2 (16g thyme/kg feed)	T3 (16g turmeric/kg feed)	T4 (8g thyme + 8g turmeric/kg feed)	
IBW (g)	685.00±75.22	693.33±49.78	800.00±115.47	826.67±188.36	0.702
FBW (g)	1381.67±116.92 ^b	1533.33±16.67 ^b	1816.67±44.10 ^a	1900.00±115.47 ^a	0.009
TWG (g)	703.33±40.96 ^b	840.00±34.64 ^b	1016.67±72.65 ^a	1073.33±36.67 ^a	0.002
ADWG (g)	12.62±0.72 ^b	15.00±0.62 ^b	18.15±1.30 ^a	19.17±0.65 ^a	0.003
TFI (g)	4550.33±57.74	4120.00±95.39	4503.33±346.04	4233.33±88.19	0.357

ADFI (g)	81.27±1.03	73.57±1.70	80.42±6.18	75.59±1.57	0.356
FCR	6.48±0.29 ^a	4.93±0.29 ^b	4.48±0.51 ^b	3.96±0.22 ^b	0.005

IBW = Initial body weight, FBW = Final body weight, TWG = Total weight gain, ADWG = Average daily weight gain, TFI = Total feed intake, ADFI = Average daily feed intake, FCR = Feed conversion ratio

This is also in line with a report by Okanlawon (2020), which states that the inclusion of turmeric in the diet of rabbits had significant effect on the weight gain which may be as result of the phytobiotic level of turmeric (*Curcuma longa*) in the body tissues of the rabbits. This result also agreed with the report of Saleh *et al.* (2014), who reported that inclusion of thyme at 7g/kg diet significantly influenced body weight gain of broiler chicken. There was significant ($p<0.05$) differences in the feed conversion ratio with rabbits in T2, T3 and T4 having similar FCR lower than T1 (control). Rabbits on T4 had the lowest (best) FCR (3.96). This result agreed with Divyalakshmi *et al.* (2020) who reported that the inclusion of turmeric at the rate of 10g/kg of feed increased the average body weight gain of rabbits compared to the control. The increase in body weight in rabbits might be due to the presence of *Curcumin* which possesses a powerful anti- platelet, anti- inflammatory, anti-oxidant, anti- bacterial and anti-viral activity which enhances digestion and absorption of nutrients in the diets, resulting in enhanced growth (Alagawany *et al.*, 2016). This result differed from the report of Okanlawon (2020), who reported that there was no significant difference ($P>0.05$) on FCR of rabbits fed diets containing varying levels of turmeric.

Haematological Characteristics

The results of the Haematological profile of Weaner rabbit fed diets supplemented with Thyme and Tumeric are presented in Table 3. The showed significant ($p<0.05$) differences among the treatments in the means on packed cell volume (PCV) with value of 44.00%. Whereas, there were no significant ($p>0.05$) effect on red blood cell count (RBC), white blood cell count (WBC), haemoglobin (Hb), mean cell haemoglobin concentration (MCHC), mean corpuscular haemoglobin (MCH), neutrophils and the mean corpuscular volume (MCV) though they were within the normal range of values for rabbits.

Table 3: Hematological profile of rabbits fed diet supplemented with thyme and turmeric

Parameters	Treatments				P-Value
	T1 (0g thyme and turmeric)	T2 (16g thyme/kg feed)	T3 (16g turmeric/kg feed)	T4 (8g thyme + 8g turmeric/kg feed)	
PCV (%)	37.67±1.45 ^b	43.67±0.88 ^a	44.00±0.58 ^a	44.00±1.53 ^a	0.013
RBC (mil/mm ²)	9.5967±0.80	10.8667±0.26	11.0967±0.22	10.6467±0.82	0.361
WBC (cells/mm ³)	9166.67±375.6	9300.33±57.74	9866.67±480.74	9466.67±233.33	0.501
Hb (g/dl)	9.033333±0.67	10.566667±0.13	10.933333±0.15	9.863333±0.94	0.185
MCHC (%)	24.133±0.69	24.233±0.75	25.200±0.17	22.867±0.88	0.196
MCV (µm ³)	37.64667±0.83	38.223333±2.46	39.686667±0.97	38.023333±1.70	0.823
MCH (pm ³)	9.856667±0.83	9.74±30.34	9.866667±0.33	8.766667±0.66	0.627
Neutrophils	23.00±1.53	25.67±2.33	20.67±1.76	17.67±1.20	0.060
Lymphocytes	71.67±4.41	71.33±2.03	76.67±1.67	77.00±2.08	0.357
Monocytes	2.33±1.45	1.67±0.333	1.00±0.58	1.33±0.33	0.701
Basophils	0.33±0.33	0.67±0.33	1.00±1.00	0.67±0.33	0.878
Eosinophils	0.33±0.33	0.67±0.33	0.67±0.67	0.67±0.33	0.931

PCV = Packed cell volume, RBC = Red blood cell, WBC = White blood cell, Hb = Haemoglobin, MCHC = Mean cell haemoglobin concentration, MCH = mean corpuscular haemoglobin

Rabbits on T4 had the best PCV value (44%). This tallies with the findings of George *et al.*, (2018) who observed that as the rate of turmeric inclusion in the diet of rabbits increased, there was a progressive increase in the Hb, PCV and RBC values of the rabbits. The increase in the PCV

was as a result of the increase in the number of Red Blood cell which is an indication of better transportation of absorbed nutrients and thus, resulted in increased primary and secondary polycythemia. The findings of this experiment also agreed with that of Abdelnour *et al.* (2018) who showed that dietary phytogenic supplementation did not affect the haemoglobin content and MCV in growing rabbits. Alagawany *et al.* (2016) opined that the phytochemical contents in curcumin has positive impacts on haematological measurements, which could be attached to the cellular plasma membranes to salvage oxidative stress in animals (Tungmunthum *et al.*, 2018).

CONCLUSION AND RECOMMENDATION

It was therefore, concluded that the inclusion of thyme at 8g/kg + turmeric at 8g/kg of feed in the diet of rabbits improved their growth performance and boosted their PCV values. It is thus, recommended that dietary inclusion of 8g thyme/kg + 8g turmeric/kg of feed should be used for the improvement of the growth performance and haematological characteristics of rabbits.

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