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Growth Performance of Starter Broilers Fed Goat Blood-Rumen Content Mixture Based-Diets Supplemented with Aromatic Plants

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Abstract

Starter broiler birds fed goat blood-rumen content mixture based-diet supplemented with aromatic plants was used to supplement soybean in the growth performance and economic analysis of birds. It was investigated using one hundred and twenty (120) day old broiler chicken of Anak strain. They were allocated to five dietary treatments with each treatment having four replicates of six birds each in a Completely Randomized Design (CRD). Diet 1 was control (0% Goat Blood Rumen Content Mixture and aromatic plants). Diet 2 contained 10% GBRCM without aromatic plants supplementation. Diet 3, 4 and 5 contained 10% goat blood-rumen content mixture supplemented with garlic (*Allium sativum*), ginger (*Zingiber officinale*) and rosemary (*Rosemarinus officinalis*) respectively. Parameters evaluated were; body weight gain, feed intake, feed conversion ratio and economic analysis. The results showed that birds fed aromatic plant supplemented diets had significantly ($p < 0.05$) improved in all parameters evaluated than birds fed the unsupplemented diet and the control diet. Diet 3 with 10% goat blood-rumen content and *Allium sativum* indicated the best performance followed by diet 4 then diet 5 respectively. The lowest cost per kg body weight gain (₦168.24) was recorded for diet T₂ (10% GBRCM) while the highest cost per kg body weight gain (₦220.05) was obtained for diet T₁ (control). The GBRCM based-diet supplemented with aromatic plants reduced the high cost of feed materials increased productivity.

Key words: Goat blood-rumen, aromatic plants, performance and starter broiler chicken

Introduction

High cost of protein feedstuff has resulted to search for alternative protein sources for monogastric animals. The scarcity of protein feed sources has contributed to poor performance or low productivity of monogastric especially poultry in Nigeria and this led to a shortage in the available animal protein to the citizenry (Adeniji and Jimoh, 2007). This high cost of convectional protein sources have doomed to competition between man and livestock with livestock industry being at disadvantaged (Akinmutimi *et al.*, 2011). Efforts to reduce the high cost of protein feed sources and then the cost of poultry products have concentrated on the use of cheaper and locally available alternative waste-products that is not consumed by humans. Furthermore, the need to exploit the economic and environmental removal of abattoir waste products (NAVN, 1994) also stimulated a renewed interest in the investigation of slaughterhouse waste products for possible use as protein feedstuffs in livestock feeds (Mohammed *et al.*, 2005). Goat blood-rumen content mixture (GBRCM) is an abattoir waste product that offers a tremendous potential as a cheap and locally available alternative feedstuffs for livestock (Swan, 1992). It has been used in Nigeria to feed poultry (Adeniyi and Balogun, 2001) and rabbits (Dairo *et al.*, 2005). Information on the combined use of goat blood-rumen and aromatic plant in broiler diet as supplement for soyabean is not revealed yet hence the for purpose of this study.

Materials and Methods

The research was carried out at the Poultry Unit of the Teaching and Research Farm, Department of Animal Science, Ebonyi State University, Abakaliki, Nigeria. One hundred and twenty (120) day old chicks of Anak strain used in this experiment were offered broiler starter diets from day 1 to day 7 for adaptation stage. Thereafter, the birds were random allotted to five (5) dietary treatments. Each treatment had four replicates of six birds per replicate in a Completely Randomized Design (CRD). Water and feed were given *ad-libitum*. Other poultry management practices were maintained (Oluyemi and Robert, 2000). The experiment lasted for five weeks (35 days). Goat Blood-Rumen Content Mixture (GBRCM) was obtained from the central slaughter house while slaughters of the goats were in progress. Rumens were opened using a sharp knife and the content was emptied into a 25 litres plastic bucket. The rumen and blood were mixed together at a ratio of 3:1. It was boiled for 30 minutes with constant stirring. The GBRCM was sun-

dried on concrete floor to about 12% moisture. The mixture was milled in a hammer mill and was stored for mixing with other feed ingredients. Five dietary treatments were formulated (Table 1). Diet 1 was control and contained 0% supplementation. Diet 2 contained 10% GBRCM based-diets without supplementation of aromatic plants. Diets 3, 4 and 5 contained 10% GBRCM supplemented with 5grams of garlic, ginger and rosemary per kilogramme of feed respectively. The data collected were subjected to a one-way analysis of variance according to the method of Snedecor and Cochran (1980). The difference in treatment means was separated using Fishers Least Significant Difference F-LSD as outlined by Obi (2002).

Table 1: Experimental Starter diets

Ingredients	T ₁	T ₂	T ₃	T ₄	T ₅
Maize	50	50	50	50	50
Soybean meal	27	17	17	17	17
GBRCM	00	10	10	10	10
Fixed ingredients	23	23	23	23	23
Total	100	100	100	100	100
Garlic	-	-	+	-	-
Ginger	-	-	-	+	-
Rosemary	-	-	-	-	+
Crude Protein	21.32	21.31	21.31	21.31	21.31
ME (Cal/g)	3070.60	2991.20	2991.20	2991.20	2991.20

Univit 15 Roche contained: 1500 I.U, Vit.A;1500 IU, Vit.D;3000 IU, Vit.E; 3.0 g, Vit. K.; 2.5g, Vit. B2; 0.3 g, Vit. B6; 8.0 mg, Vit. B12; 8.0 g, Nicotinic acid; 3.0, Ca-Panthothenate; 5.0 mg, Fe;10.0g, Al; 0.2 g, Cu; 3.5 mg, Zn; 0.15mg, I; 0.02 g, Cu; 0.01 g, Sc. GBRCM = Goat blood- rumen content mixture. PKC = Palm Kernel Cake. +5 g of garlic, ginger and rosemary per kilogramme of feed. ME (Cal/g) = Metabolizable energy (calories /gram)

Results and Discussions

The effect of goat blood-rumen content mixture supplemented with aromatic plants on the performance of broiler starters were presented on Table 2. The performance of broiler starter fed experimental diets showed that the final body weight and daily weight gain of the birds were significantly ($p<0.05$) improved by aromatic plants supplementation of GBRCM diets than the control. The improved weight gain of birds fed garlic, ginger and rosemary supplemented diets were in line with the reports by Tekeli *et al.* (2006). The feed intake of broiler chicks fed supplemented goat blood-rumen content mixture with aromatic plants was significantly ($p<0.05$) improved by the supplements. This might be caused by the lower energy values of the diets containing goat blood-rumen content mixture (GBRCM) to make up their energy requirements (Adeniji, 2008; Onu *et al.*, 2011). Similar observations were reported by Mohammed *et al.* (2005) and Teimour *et al.* (2005) that the birds eat to satisfy its energy requirement, and they tend to attain their energy level faster (Onu, 2007). In terms of feed conversion ratio of birds, the group fed supplemented diets recorded significantly ($p<0.05$) superior feed conversion ratio than those fed the control diet. This observation strengthened the reports of Ghazalah and Ali (2008).

Table 32 Performance characteristics of broiler starters fed the experimental diets

Parameter (g)	0% GBRCM + 0%APs	10% GBRCM + 0%APs	10% GBRCM + Garlic	10% GBRCM + ginger	10% GBRCM rosemary	SEM
Initial weight (g)	147.92	143.75	150.00	147.92	145.84	1.47
Avg. final body weight	1139.58 ^b	1118.75 ^b	1293.75 ^a	1283.34 ^a	1279.17 ^a	26.22
Avg. daily weight gain	28.33 ^b	27.86 ^b	32.86 ^a	32.71 ^a	32.38 ^a	0.75
Avg. daily feed intake	86.81 ^b	87.05 ^b	90.84 ^a	90.06 ^a	90.00 ^a	0.50
Feed conversion ratio	3.07 ^a	3.15 ^a	2.77 ^b	2.79 ^b	2.81 ^b	0.07

APs = Aromatic plants; GBRCM = goat blood rumen content mixture; But a, b, means with different superscripts along the same row are significantly ($p<0.05$) different, SEM = Standard error of the means, Avg. = average.

The effects of dietary treatments on economic analysis of broiler starters were represented in Table 3. The results revealed that cost savings ranged from 7.29% (T₃) to 51.81% (T₂). The cost savings were higher in supplemented diets than the unsupplemented diet (T₂).

Table 3: Economics of experimental diets

Parameters (N)	T1	T2	T3	T4	T5
Cost of feed per Kg (N)	73.04	56.64	57.44	58.54	58.64
Daily Feed intake (g)	86.81	87.05	93.94	90.06	90.00
Cost of feed consumed (N)	221.90	172.55	185.01	184.45	184.72
Cost of Body Weight Gain (g)	991.67	975.00	1150.00	1136.67	1133.33
Cost/Daily Body Weight Gain (N)	220.05	168.24	212.76	209.66	209.35
Cost savings (%)	-	51.81	7.29	10.39	10.70

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