EFFECT OF GOAT BLOOD-RUMEN CONTENT MIXTURE BASED-DIETS SUPPLEMENTED WITH AROMATIC PLANTS ON THE PERFORMANCE OF STARTER BROILERS

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Abstract

A 35 days feeding trial was conducted to evaluate the effect of goat blood-rumen content mixture diets supplemented with aromatic plants on the performance of starter broilers. Five experimental diets were formulated such that diet 1 (T_1) which served as control, contained 0% GBRCM and aromatic plants. Diet 2 (T_2) contained 10% GBRCM without aromatic plants supplementation. Diet 3, 4 and 5 (T_3, T_4 and T_5) contined 10% goat blood-rumen content mixture supplemented with garlic (Allium sativum), ginger (Zingiber officinale) and rosemary (Rosemarinus officinalis) respectively. 120 day old Anak broilers were assigned to the five diets in a Completely Randomized Design (CRD). Each group was replicated four times with six birds per replicate. Results showed that birds fed aromatic plant supplemented diets had significantly ($P<0.05$) higher body weight gain, feed intake, superior feed conversion ratio, protein intake and protein efficiency ratio than birds fed the unsupplemeted diet and the control diet. There was no significant ($P>0.05$) difference on the body weight gain, feed intake, feed conversion ratio, protein intake and protein efficiency ratio of the birds fed the control diet (T_1) and unsupplemented diet (T_2). The study indicated that GBRCM supplemented with aromatic plants (ginger, garlic and rosemary) could effectively be added to starter broiler ration to improve the quality of the feed and the performance of the animals

Keynote: Garlic, Ginger, Goat blood-Rumen content, performance, Rosemary

Introduction

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). However, the usefulness of Goat blood-rumen content mixture as feedstuff in non ruminant diets is constrained by its relative high fibre content which causes increased viscosity of the gut content and adversely affect nutrient digestibility (Galassi *et al.*, 2004; Len, 2008). Modern poultry production requires the use of safe and effective natural feed dditives to stimulate feed consumption and destroy harmful microorganisms and increase poultry productivity. Medicinal herbs such as garlic (*Allium sativum*), ginger (*Zingiber officinale*) and rosemary (*Rosemarinus officinalis)* have been reported to possess antibacterial, antiseptic, anti-inflammatory, antiparasitic and immunomodulatory properties (Shuangsheng and Rong-liang, 2006; Muhammad *et al.*, 2009). In addition to these attractive properties, herbs and spices have been shown to increase feed palatability and thus feed intake (Horton *et al.*, 1991). Because of the antimicrobial, antioxidant and flavour enhancing properties of garlic, ginger and rosemary. These herbs may promote growth and utilization of agro by-products such goat blood rumen content in monogastric animals such as poultry. Despite the high nutrient content of GBRCM and the benefiticial effects of spices and on animal performance, there is paucityof information on its use in broiler feeding.

Materials and Methods

The research was carried out at the Teaching and Research Farm (Poultry Unit) of Department of Animal Science, Ebonyi State University, Abakaliki, Nigeria. Goat rumen content was mixed with blood at a ratio of 3:1and boiled for 30 minutes with constant stirring. The goat blood rumen content mixture (GBRCM) was sun-dried and milled in a hammer mill

Five experimental diets were formulated such that diet T_1, contained 0% goat blood-rumen content and without supplementation (control). Diet T_2 contained 10% goat blood-rumen content based-diets without supplementation of aromatic plants. Diets T_3, T_4 and T_5 contained 10% goat blood-rumen content mixture supplemented with 5grams of garlic, ginger and rosemary per kilogramme of feed respectively. Diets were formulated to meet the requirements by the *National Research Council (1994)* for broilers of this age.

One hundred and twenty (120) day old chicks of

Anak breed were allowed to acclimatize for 7 days. On the 8th day, the birds were randomly allotted to five (5) treatments in a completely randomized design (CRD). Each treatment was replicated four times giving six birds per replicate. Feed and water were provided *ad libitum*. Parameters measured were weight gain, feed intake, feed conversion ratio, protein efficiency and economics of production.The experiment lasted for 35days. Other routine poultry management practices were also maintained.

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).

Results and Discussion

The effect of goat blood-rumen content mixture supplemented with aromatic plants on the performance of broiler staters were presented on Table 1.

The results on the effect of GBRCM and aromatic plants show that there were marked (P<0.05) variations in the final body weight, body weight gain and daily body weight gain of the broilers chicks among the treatment groups. Birds fed spice treated goat blood-rumen content mixture (GBRCM) recorded siginificantly (P<0.05) higher final body weights, body weights gain and daily weights gain than birds fed uunsupplemented GBRCM and contol diets. The higher weight gain of birds fed GBRCM diets supplemented with spices than the unsupplemented and the control could be that the spices controlled and limited the growth and colonization of numerous pathogenic species of bacteria in the gut leading to improved translation of feed to meat (Onu and Aja, 2011). The improvement in body weight of birds could also be attributed to their positive effect on nutrient digestibility (Birrenkott *et al.*, 2000; Tekeli *et al.*, 2006). There was no siginficant (P>0.05) difference between the birds fed supplemented GBRCM. Also, there was no significant (P>0.05) difference in weight gain of broilers fed the control and unsupplemented diets. The lower weight gain of birds fed T_2 (unsupplemented 10% GBRCM) diet could be due to the drop in digestive efficiency impaired by high crude fibre content of the diet (Agbede *et al*, 2002).

Birds fed supplemented GBRCM diet consumed significantly (P<0.05) more feed than birds fed unsupplemented GBRCM and control diets. Birds fed control diet had similar (P>0.05) feed intake compared to birds fed unsupplemented GBRCM. The higher feed intake of birds fed supplemented diets may be attributed to an improvement in palatability and the fast digestion effect from these natural products (garlic, ginger and rosemary) (Onu, 2010).

Feed conversion ratio of the birds were significantly (P<0.05) affected by the treatments. Supplementation of the GBRCM diets with aromatic plants significantly (P<0.05) improved the feed conversion ratio and protein efficiency ratio of the birds. There was no marked (P>0.05) variation in the feed conversion ratio and protein efficiency ratio of the broilers fed the control and unsupplemented diets. The improvement of feed conversion and protein efficiency ratio of birds fed supplemented diet might be due to the antbacterial and antifungal properties of these spices which might have improved the microflora and gut location of birds resulting in improved feed and protein utilization (Ghazalah and Ali, 2008 and Onu, 2010).

The economics of production data showed that cost of feed per kilogram (N) reduced steadily from 73.04 in T1 to 56.64 in T2 as presented in Table 2. This could be attributed to the partial replacement of the more expensive maize and soyabean with GBRCM that did not cost anything. The total cost of feed consumed per bird and cost of feed per kilogram gain (N) showed a reduction. However it appreciated in supplemented diets (T_3, T_4 and T_5). This could not be unconnected to the high feed consumption of birds fed the supplemented diets. Cost saving in (%) recorded the highest cost saving value of 23.87% in T_2 followed by 10.72% , 9.75% and 9.88 in T_3, T_4 and T_5 respectively.

It is obvious from the results of this study that GBRCM can be incorporated in broiler starter diets without any deleterious effect on the the performance of the birds. However, to gain advantageous effects of GBRCM as a feed ingredient in broiler diets, they can be supplemented with aromatic plants like garlic, ginger and rosemary. It be could be therefore affirmed that supplemented and unsupplemented GBRCM can economically be substituted in broiler

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Table 1 : 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[a]	143.75[a]	150.00[a]	147.92[a]	145.84[a]	1.47
Av. Final Body Weight	1139.58[b]	1118.75[b]	1293.75[a]	1283.34[a]	1279.17[a]	26.22
Av. Body Weight Gain	991.67[b]	975.00[b]	1150.00[a]	1136.67[a]	1133.33[a]	26.23
Av. Daily Weight Gain	28.33[b]	27.86[b]	32.86[a]	32.71[a]	32.38[a]	0.75
Average Feed Intake	3038.34[b]	3046.67[b]	3179.17[a]	3152.06[a]	3150.00[a]	17.64
Av. 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]	2.7[b]	2.81[b]	0.07
Daily Protein Intake	18.51[b]	18.55[b]	19.36[a]	19.20[a]	19.18[a]	0.11
ProteinEfficiency Ratio	1.53[b]	1.50[b]	1.70[a]	1.69[a]	1.69[a]	0.03

a, b, means with same superscripts along th e same row are significantly (P>0.05) the same; P.E.R means Protein Efficiency Ratio; APs = Aromatic plants; GBRCM = goat blood rumen content mixture.

Table 2: Economics of Production of starter broilers fed the Experimenta diets

Parameters (₦)	T_1 ₦	T_2 ₦	T_3 ₦	T_4 ₦	T_5 ₦
Cost of feed per Kg (₦)	68.04	56.64	57.44	58.54	58.64
Cost of feed consumed (₦)	221.96	172.55	189.00	184.45	184.72
Cost of feed per kg Weight Gain (₦)	832.35	633.66	743.13	751.27	750.11
Cost savings (%)	-	23.87	10.72	9.75	9.88