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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

Evaluation of Performance, Organ Characteristics and Economic Analysis of Broiler Finisher Fed Dried Rumen Digesta

B.O. Esonu, U.D. Ogbonna, G.A. Anyanwu, O.O. Emenalom,
M.C. Uchegbu, E.B. Etuk and A.B.I. Udedibie

Department of Animal Science and Technology, Federal University of Technology, Owerri, Nigeria

Abstract: A 28-day feeding trial involving 264, 5-week old Hubbard broilers was carried out in a completely randomized design to evaluate the performance, organ characteristics and economic analysis of broilers fed dried rumen digesta (DRD) at dietary levels of 0, 5, 10 and 15% respectively. Feed intake of the groups on varying dietary levels of dried rumen digesta were significantly ($P<0.05$) higher than the control (0%) group. Birds on diets containing dried rumen digesta recorded higher body weight gain than the control (0%) group. However, this increase in body weight, feed conversion ratio and relative organ weights were not significant ($P>0.05$). The lower feed cost per kilogramme meat produced on dried rumen digesta diet suggest that the material is economically viable alternative. Further research is necessary to investigate the biosafety of dried rumen digesta.

Key words: Dried rumen digesta, economic analysis, feed ingredient

Introduction

Feed constitute the dominant input in animal production ranging from 65-75% of the total cost of production. Similarly, feed ingredient account for over 90% of compound feed industry.

Therefore, the relationship between feed ingredient and animal product output is both direct and obvious. It has been reported that conventional feedstuffs are very expensive and scarce, the high cost and scarcity derived from crippling realities that are characteristics of third world developing economies (Esonu *et al.*, 2001; 2002; 2004).

They vary in nature from technological to economic, sociological, political and environmental limitations of our system. Conventional ingredients are expensive because they suffer from stiff competition with channels in the food chain which command higher priority and can pay higher prices than the compound feed industry. This scenario has greatly reduced the rate of expansion of the poultry industry in Nigeria, which has further diminished the already low intake of animal protein intake of the populace (Madubuike, 1992).

There is therefore an urgent need for alternative locally available and cheap sources of feed ingredients particularly those that do not attract competition in consumption between humans and livestock.

One possible source of cheap material is dried rumen digesta (DRD). Dried Rumen Digesta not only serve as a feed nutrient, recycling it will also reduce disposal and environmental pollution problem.

The trial herein reported was therefore designed to examine the nutritional value of Dried Rumen Digesta in broiler finisher diets.

Materials and Methods

The rumen digesta was collected from the abattoir at Obinze in Imo State of Nigeria and sun dried for 3-4 days depending on the intensity of the sun. The sun dried material was milled in a hammer mill to produce finely ground dried Rumen Digesta meal. Sample of the material was subjected to proximate analysis according to AOAC (1995) (Table 1).

Table 1: Proximate Composition of Dried Rumen Digesta (DRD) (%DM)

Nutrient	Proximate Composition
Moisture	18.20
Crude fibre	15.30
Crude protein	18.52
Ash	7.60
Ether Extract	8.79
Nitrogen free extract	38.39

Based on the result of the chemical analysis, four broiler finisher diet were formulated to contain Dried Rumen Digesta at 0%, 5%, 10% and 15% inclusion levels respectively. The treatment diets were isocaloric and isonitrogenous (Table 2).

Two hundred and sixty-four, 5-week old Hubbard broiler chicks were divided into four groups of 66 birds each and randomly assigned to the four treatment diets in a completely randomized design (CRD) experiment. Each treatment group was further sub-divided into three replicates of 22 birds per replicate and kept in a 6m x 8m compartment. Feed and water were provided ad-libitum. Feed intake was recorded daily and the birds were weighed weekly. Other routine poultry management procedure were maintained. The feeding trial lasted 28 days. At the end of the 28th day, four birds were randomly selected from each treatment for carcass and organ

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Table 2: Ingredient Composition of the Experimental Diets

Ingredients	Dietary Levels of Dried Rumen Digesta (%)			
	0%	5%	10%	15%
Maize	55.0	55.0	55.0	55.0
DRD	0.0	5.0	10.0	15.0
Palm Kernel Cake	7.50	5.00	0.50	0.50
Soyabean meal	25.0	25.0	25.0	25.0
Fish Meal	8.00	5.50	5.00	5.00
Bone Meal	3.50	3.50	3.50	3.50
*Vitamin/TM premix	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Common Salt	0.25	0.25	0.25	0.25
Chemical Composition (% DM)				
Crude Protein	20.05	20.03	20.05	20.05
Crude Fibre	2.47	2.90	2.91	2.91
M.E. (Kcal/kg)	2.84	2.83	2.82	2.82

To provide the following per keg of feed Vit. A-10,000iu, vitamin D 2000iu, vitamin B₁ 0.75mg, Nicotinic acid 25mg, Calcium Pantothenate 12.5mg, Vitamin B₁₂ – 25mg, Vitamin K₃ – 2.5mg, Vitamin E – 2.5mg, Cobalt - 0.4mg, Biotin – 0.50mg, Folic Acid - 1.00mg, Choline Chloride-25mg, Copper-0.8mg, Manganese - 64mg, Zinc-40mg, Iodine-0.8mg, Flavomycin-100mg, Spiramycin-5mg, DL-methionine-50mg, Selenium-0.16mg, L-Lysine-12mg.

Table 3: Performance, Organ Characteristics and Economic Analysis of Finisher Broilers Fed Different Levels of Dried Rumen Digesta (DRD)

	Dietary Inclusion Levels (%)				
	0.0	5.0	10.0	15.0	SEM
Performance					
Initial body wt(g)	1637.5	1812.15	1803.6	1785.75	3.58
Final body wt(g)	3008.70	3389.95	3388.40	3382.03	5.88
Body wt. Changes(g)	1371.2	1577.80	1584.8	1596.28	3.55
Daily wt. Gain (g)	48.90	56.35	56.60	57.01	5.02
Daily feed intake (g)	110.0 ^a	120.42 ^b	121.21 ^b	127.20 ^b	4.08
Feed Conversion Ratio	2.24	2.13	1.14	2.23	0.50
Mortality (No)	1.0	1.0	1.0	1.0	-
Relative Organ Weight					
Live wt (g)	2850.00	3350.00	3350.00	3352.00	0.80
Carcass (%)	92.06	97.67	96.09	93.75	2.24
Dressing (%)	76.19	76.74	77.39	72.92	0.35
Heart %	0.45	0.51	0.45	0.40	0.61
Gizzard %	2.61	3.89	3.54	3.80	0.19
Liver %	1.41	2.24	1.58	1.80	1.3
Kidney %	0.12	0.09	0.16	0.13	1.3
Economic Analysis					
Cost of feed (N/kg)	54.70	50.40	49.30	49.30	-
Meat Produced (N/kg)	165.19	155.74	160.54	162.04	-
Feed cost saving (%)	-	7.86	5.47	5.47	-

ab means in different rows bearing different superscripts are significantly different (P>0.05)

weight evaluation. The birds were fasted for 24 hours before slaughter. Dressing percentage, weights of heart, liver, and kidney were determined following the methods described by Adeniyi (2005). Data collected were subjected to analysis of variance (Snedecor and Cochran, 1978). Where significant treatment effects were detected from the analysis of variance, means were compared using Duncan's New Multiple Range Test as outlined by Obi (1990).

Results

The chemical composition of Dried Rumen Digesta is shown in Table 1, while the nutrient composition of the

experimental diets is shown in Table 2. Data on performance, organ characteristics and economic analysis of the birds on the various dietary levels of Dried Rumen Digesta are presented in Table 3.

Feed intake of the birds on varying inclusion levels of Dried Rumen Digesta were significantly (P<0.05) higher than the control group. The body weight gain of the groups followed the same trend as feed intake. Birds on diets containing dried rumen digesta recorded higher body weight gain than the control group. However, this increase, feed conversion ratio and relative organ weights were not significant (P>0.05).

Dietary inclusion of dried rumen digesta reduced cost of

producing one kilogramme of feed and this reflected in the cost of meat (N1kg) produced.

Discussion

The increased feed intake of the birds on the diets containing dried rumen digesta meal is understandable, dried rumen digesta contain high fibre which tend to increase the total fibre content of the diet and dilute other nutrients. Birds must therefore eat to meet their energy requirement to sustain rapid growth and development, hence the increased feed intake. This result agrees with earlier reports from Ash and Akoh (1992), Opara (1996), Omekam (1994), Esonu *et al.* (2002). Birds on the dried rumen digesta diets performed generally better than the control group. This improved performance could be attributed to higher protein component of the test undigested starchy and fibrous carbohydrates, long chain fatty acids and partially digested feed protein (Okorie, 2005; material due to the influence of the microbial protein, Ekwuoma, 1992 and Whyte and Wadak, 2002). The improved performance could also probably be due to adequate dietary crude fibre level. Crude fibre activates the intestine and more occurrence of peristaltic movement, more enzyme production resulting in efficient digestion of nutrients (Kekeocha, 1984; Esonu *et al.*, 2001; Esonu *et al.*, 2004).

The lower feed cost per kilogramme meat produced on dried digesta suggest that the material is economically viable alternative. The use of dried rumen digesta in broiler diets will definitely improve the sanitary condition of our environment. The next focus of this research will be to investigate the biosafety of dried rumen digesta.

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