

EFFECT OF RICE OFFAL AS REPLACEMENT FOR WHEAT OFFAL IN DIET OF WEANER RABBITS (*ORYCTOLAGUS CUNICULUS*) ON ECONOMICS OF PRODUCTION

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Abstract

This study evaluates the effect of rice offal (*Zea mays*) as replacement for wheat offal in diet of weaner rabbits (*Oryctolagus cuniculus*) on growth performance, nutrient digestibility and economics of production. A total of 60 rabbits mixed sexes aged 5-6 weeks were used in the experiment. Five experimental diets were formulated using graded levels (0, 25, 50, 75 and 100%) and designated as diets 1, 2, 3, 4, and 5 with groundnut haulms constituting 20% and soya beans as protein source with 12 rabbits per treatment each treatment was replicated three times with 4 rabbits per replicate in a Completely Randomised Design. However, there was significant ($p < 0.05$) differences on values for feed cost, total feed cost, feed cost per kilogram gain, cost saving and % saving cost. The economics of production revealed that feed cost (N /kg) decreases with increase in rice offal at 25% with corresponding improvement in cost saving values as observed on the cost analysis. It was concluded that rice offal can serve as fibrous source which replace wheat offal at 25% in the diets of weaner rabbits without compromising performance and carcass yield of rabbits.

Keywords: Weaner Rabbit, Rice Offal, Economics of Production, Wheat Offal, Growth Performance

Introduction

In spite of the abundance of rice offal, it has been neglected as animal feeds because it contains high level of fibre and low protein and energy. According to Kerley and Allee, (2003) rice offal has influence on balance of nutrients in the diets and animal performance (Kerley and Allee, 2003). Offal of rice normally contains 9-18% crude protein and 10-14% crude fibre (Atteh, 2002). Olomu (2010) reported 13.20% crude protein, 11.50% crude fibre, 13.00%, fat 42.80% Nitrogen Free Extract and 2100 Kcal/kg ME. The nutritive value of rice bran has been observed to be quite low compared to wheat and maize offal (Singh *et al.*, 2002). Rice offal has high lysine and Methionine content (Makinde, 2014). However, its phytate content, enzyme inhibitor, high fibre content and oxidative rancidity may have deleterious effects. They have laxative action in the gut and because of their fibre content; it can be used as nutrient diluents for monogastric animals (Atteh, 2002).

This study evaluates the effect of rice offal with groundnut haulms as replacement for wheat offal in diet of weaner rabbits (*oryctolagus*) on economics of production,

Materials and Methods

Experimental Site

The research was conducted in the Rabbitry section Dagwom Farm, National Veterinary Research Institute, Vom, Plateau State in the Sudan savanna zone of North Central Nigeria.

Experimental Diets

In this experiment, five iso-nitrogenous diets were formulated to meet 16% crude protein nutritional requirements of the weaner rabbits and similar levels of crude fibre by replacing 1 wheat offal with graded levels of rice offal respectively in which groundnut haulms constituted 20% of each diet. The diets were designated 1, 2, 3, 4 and 5. Diet 1 contained wheat offal which served as the control (0%) while treatments (2-5) contained rice offal at graded levels of 25, 50, 75, and 100% respectively. The test ingredients and five diets were analysed for their proximate composition. The gross and proximate composition of the diet were shown in Table 1.

Table 1. Ingredients and Percentage Composition of Diets Containing Graded levels of Maize Offal in Diets of Weaner Rabbits.

Ingredients	Diets				
	1 0%	2 25%	3 50%	4 75%	5 100%
Maize	31.87	30.98	30.10	29.91	28.34
Soya beans	14.88	15.77	16.65	17.53	18.41
Wheat Offal	30	22.5	15	7.5	0
Rice offal	0	7.5	15	22.5	30
Groundnut haulms	20	20	20	20	20
Bone meal	1.5	1.5	1.5	1.5	1.5
Limestone	1.0	1.0	1.0	1.0	1.0
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.13	0.13	0.13	0.13	0.13
Methionine	0.12	0.12	0.12	0.12	0.12
Total (%)	100	100	100	100	100
Calculated Analysis (%)					
Crude Protein (CP)	16.00	16.00	16.00	16.06	16.00
Metabolisable	2619.705	2687.423	2755.214	2846.699	2890.795
Energy(ME Kcal/Kg)					
Crude fibre (CF)	9.01	9.15	9.49	9.83	10.17
Ether Extract (EE)	4.63	4.78	4.94	5.12	5.24
Calcium	1.09	1.10	1.10	1.12	1.11
Phosphorus	0.50	0.58	0.53	0.54	0.56
Lysine	1.39	1.38	1.36	1.35	1.34
Methionine	0.54	0.54	0.54	0.55	0.55
Ash	4.76	4.09	5.43	5.77	6.09

Bio-premix supplied per kg of diet: Vitamin A, 12500I.U; Vit. D3, 2500 I.U; Vit E, 50mg; Vit K3, 2.5mg; Vit B3.0mg; VitB6 6.0mg; Niacin, 40.0mg; Calcium pantothenate 10.0mg; Biotin 0.8mg; VitB 12 0.25mg; Folic acid 1.0mg; Choline chloride 300mg; Manganese 100mg; Iron 100mg; Zinc,50mg;Iodine 1.55I.U; Selenium 0.1mg

Experimental Design

After the 7 days acclimation period, the rabbits were randomly distributed into 5 groups of 12 rabbits, divided into three replicates of 4 rabbits per replicate in a Complete Randomise Design (CRD).

Data Collection

Economics of Production Analysis

The following parameters were used to estimate the cost and returns of the by - products and other feed ingredients used in production includes:

Cost of feed per kilogram (N/kg) – This was computed using the prevailing market prices of ingredients.

Cost of feed per unit weight gain- This was be computed as the feed conversion ratio multiplied by the unit price of feed.

Cost of production: The cost of production was estimated as sum of cost of animals, feed, medications, labour and housing.

Statistical Analysis

Data obtained were subjected to One Way Analysis of Variance (ANOVA) using the SPSS statistical package version 25, where applicable, significant differences between the means will be separated using Duncan's New Multiple Range Test.

Results and Discussion

Economics of Production of Weaner Rabbits Fed Graded Levels of Rice Offal with Groundnut Haulms as Replacement for Wheat Offal

The results of economics of production and cost benefits of weaner rabbits fed rice offal diets are presented in Table 8. Total feed intake (kg) and total weight gain (kg) were not influenced statistically by dietary treatments of rice offal. The values for total feed take ranged between (4.91 – 5.18kg) diet 5 and diet 1. The highest value (5.18kg) was obtained on diet 5 and lowest value (4.91kg) on (control) diet 1 was similar across treatments groups although there were slight differences numerically as levels of maize offal increased. The total weight gain ranged from (1.06 – 1.32kg) highest value obtained on diet 2 and lowest value (1.06kg) on diet 5. Feed cost in naira per kilogram values ranged between (79.90 – 92.95₦/kg) the highest value (92.95₦/kg) obtained on (control) diet 1 and lowest value (79.90₦/kg) on diet 5 were significant ($p < 0.05$) across dietary treatments means. The total feed cost was highest (456.38₦) on diet 1 and lower value (413.88₦) on diet 5 showed significant ($p < 0.05$) difference across treatments means. Feed cost per kilogram ranged between (338.56 – 390.45₦/kg) highest value (390.45₦/kg) on diet 5 and lowest feed cost value (338.56₦/kg) obtained on diet 4 were significant ($p < 0.05$) across treatment means. Cost saving (₦) were significant ($p < 0.05$) across dietary treatments with highest value (41.76₦) on diet 4 and lowest (10.13) on diet 5. Percentage cost saving (₦) obtained was best (92.35₦) on diet 2 (50%) and poorest (2.66₦) on diet 5 were affected significantly ($p < 0.05$) by dietary levels of rice offal. It was observed that best % cost saving was on weaner rabbits fed diets 2 (50%).

Table 8: Economic of Production of Weaner Rabbits Fed Graded Levels of Rice Offal Diets as Replacement for Wheat Offal

Parameters	Diets					SEM
	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)	
Total Feed Intake (kg)	4.91	5.16	4.97	5.01	5.18	0.22 ^{NS}
Feed Cost ₦/kg	92.95 ^a	88.19 ^b	88.19 ^b	83.12 ^c	79.90 ^d	1.23*
Total Feed Cost (₦)	456.38 ^a	455.06 ^a	438.30 ^b	416.43 ^c	413.88 ^d	4.87*
Total Weight Gain (Kg)	1.20	1.32	1.11	1.23	1.06	0.22 ^{NS}
Feed Cost 1kg Gain (₦)	380.32 ^c	344.74 ^d	394.86 ^a	338.56 ^e	390.45 ^b	7.29*
Cost Saving ₦	0.00 ^e	35.58 ^b	14.54 ^c	41.76 ^a	10.13 ^d	4.22*
Saving Cost %	0.00 ^d	92.35 ^a	3.82 ^c	10.98 ^b	2.66 ^c	9.46*

a, b, c means with different superscripts on the same row differ significantly (* = $P < 0.05$), SEM = Standard Error of Mean, NS = Not significant, * = Significant

Discussion

Economics of Production of Weaner Rabbits Fed Graded Levels of rice Offal with Groundnut Haulms as Replacement for Wheat Offal

The economic cost benefits of feed cost in naira per kilogram, total feed cost in naira, total weight gain in kilogram, feed cost per kilogram gain in naira, cost saving in naira and percentage cost saving in naira indicate the influence of experimental diets on the economics of production of the weaner rabbits. The feed cost in naira per kilogram and total feed cost in naira were highest on diet 1 with values of 92.95₦/kg and 456.38₦/kg respectively while rabbits fed rice offal attracted the least feed cost, despite high feed intake per kilogram. This is a reflection of the lowest feed per kilogram on weaner rabbits fed diet 2. In same vein, highest feed cost per kilogram body weight gain value of 344.74₦/kg was lowest on 25% inclusion level of rice. The cost saving in naira value of ₦35.58 was best on rabbits fed 25% rice offal diet compared to the control. Percentage cost saving in naira 92.35₦ showed a saving cost in the production of weaner rabbits on rice offal diets. This agrees with the work of Maidala (2015) that with increase in African locust bean fruit pulp in the diet of rabbits decreases the cost of feed and the work reported by Tewe and Bokanga (2001); Ojebiyi *et al.* (2010), the cost of of cassava products is about 40% lower than that of maize. Hence, inclusion of rice offal in diet is economically profitable

Conclusion

Rice offal with 20% groundnut haulms in diets of weaner rabbits can replace wheat offal as fibre source at 25% in diets of weaner rabbits without adverse effects.

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