

COMPARATIVE ANALYSIS OF SOME COMMERCIAL FEEDS SOLD IN AKURE METROPOLIS ON PERFORMANCE OF LAYING BIRDS

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ABSTRACT

The comparative analysis of four commercial diets using chemical analysis and performance of laying birds as response criteria was evaluated on one hundred and twenty (120) ISA Brown laying birds of 22 weeks old in a completely randomized design. The commercial diets were coded as CKM, TFM, ABM and ACM. Live weights of the hens were taken at the start and end of the trial so as to determine the average body weight change. The numbers of eggs laid per treatment were recorded daily, and hen day production (HDP) and feed conversion ratio (FCR) were calculated. Significant differences ($P < 0.05$) were found in the proximate compositions with crude protein (CP) values between 14.91% and 17.41%; ether extract (2.50%-4.71%), fibre (3.69%-5.18%) and ash content (13.30%-19.47%). The performance indices were significantly ($P < 0.05$) influenced by the test diets. Feed intake was between 100.61g and 123.96g/bird with the highest value recorded in birds fed with TFM while the lowest feed intake was recorded in birds fed CKM. Also, HDP value was between 43.33% and 55.04% and was highest for TFM. The best value (2.30) recorded for FCR was from birds fed ACM while birds fed ABM had the least value (2.71). Hence, it can be concluded that these commercial feeds are good for the optimum performance of laying hens although feed TFM gave the best performance output among the feeds.

Keywords: Feed quality, ISA brown layers, Commercial layers mash, Egg production, Feeding

INTRODUCTION

Nigeria, due to her ever-increasing population experiences inadequate supply of animal protein in the diet of a good number of the populace, especially among rural dwellers who constitute a large proportion of the entire population (Millward *et al.*, 2008). Monogastric animal production and poultry production in particular is capable of alleviating this by contributing significantly to food security in the country. Chicken products such as eggs and meat are majorly protein sources with high biological value (Alex *et al.*, 2018).

However, cost of feed gulps the largest proportion of the total cost of production in the poultry industry. Most times, over 75% of total cost of production is expended on feeding, out of which 50% is used to purchase protein and energy-giving feed ingredients (Ahaotu *et al.*, 2013; Okonkwo and Ahaotu, 2019). In recent times, the poultry industry witnessed scarcity and soaring prices of these nutrients and according to Roy *et al.* (2004), it is apparent that diets/feeds given to these birds have positive correlation with their performance and profitability. So, there is need for time-to-time monitoring of these feeds to ensure that quality is not compromised. Visual observation, chemical analysis and on-farm trials could be used to achieve this (Roy *et al.*, 2004).

The objective of this study therefore was to assess the quality of four commercial layers' mash sold in Akure, Ondo State using proximate and on-farm analyses.

MATERIALS AND METHODS

The research was carried out at the Poultry Unit of the Livestock Section, Teaching and Research Farm, Federal University of Technology, Akure, Ondo State. One hundred and twenty (120) ISA Brown point-of-lay hens of seventeen (17) weeks old were procured from a reputable farm in Ibadan, Oyo State. On arrival, anti-stress was administered in order to stabilize the birds and they were managed till 10% Hen Day Production (HDP) was recorded before the commencement of the experiment.

At the 22nd week, the birds were divided into four (4) treatments which represented the commercial feeds coded as CKM, TFM, ABM and ACM in a completely randomized design. The declared nutrients compositions of the diets by the manufacturers are shown in Table 1. Each bird was given 125g of feed per day and the trial lasted for five (5) weeks. Live weights of the hens were taken at the start and end of the trial so as to determine the average body weight change. The numbers of eggs laid per treatment were recorded daily and HDP for each treatment was calculated as

$$\text{HDP(\%)} = \frac{\text{Total Number of Eggs Produced Each Day}}{\text{Number of Hens Alive For That Day}} \times 100$$

Feed conversion ratio (FCR) was calculated as:

$$\text{FCR} = \frac{\text{Total feed intake per bird}}{\text{Total egg produced}} \times 12$$

All data obtained were subjected to one-way Analysis of Variance (ANOVA) using SPSS version 23.0 (SPSS Software products, Marketing Department, SPSS Inc Chicago, IL, USA). Significant differences were compared using Duncan Multiple Range Test (DMRT) of the same package.

Table 1: Nutrient compositions of the commercial layers' mash

Parameters (%)	CKM	TFM	ABM	ACM
Crude Protein	16.50	16.50	16.50	16.50
Crude Fibre	5.00	5.00	6.00	5.00
Fat and Oil	5.00	5.00	5.00	4.40
Calcium	3.50	3.80	2.00	3.75
Lysine	0.80	0.80	0.80	0.80
Methionine	-	0.40	0.34	-
Salt	-	-	0.03	-
Metabolizable Energy	2500	2650	2500	2650

RESULTS AND DISCUSSION

Table 2 shows the proximate composition of the four commercial diets. Significant differences ($P < 0.05$) were found in all parameters analysed. Crude protein (CP) was highest (17.41%) for ACM and lowest (14.91%) for CKM. According to USDA (2003), the CP content for layers can fall within the range of 12.50%-18.80%. Feed TFM had the highest fibre content of 5.18% while ABM had the lowest value for crude fibre (3.69%). Feed CKM had the highest ash content (19.47%) and ACM had the lowest value (13.30%). In the study conducted by Ebenebe *et al.* (2013) on layers, a range of 4.02-4.82% was reported for crude fibre and 11.50-16.15% was

reported for ash. The high nutritive status of the four commercial diets could infer good egg qualities due to the high mineral and CP contents.

Table 3 shows the performance of layers on the four commercial diets. The final weight, feed intake, percent HDP and FCR were all significantly ($P < 0.05$) influenced by the diets but weight gain was not significantly different ($P > 0.05$). The highest values for HDP (55.04%) and total egg produced (19.27) were recorded in birds fed TFM while the lowest values for HDP (43.33%) and total egg produced (15.07) were recorded in CKM. Also, the best FCR (2.30) was recorded in birds fed with diet ACM while the lowest FCR (2.71) was recorded in birds that consumed ABM. In this study that feed intake ranged between 100.61g – 123.69g/day. This observed value range is comparable with 103.97–110.49 g reported by Oyewole *et al.* (2018), but lower than 128–148 g observed by Iheukwumere *et al.* (2007). The least HDP recorded in CKM (43.33%) might have been due to the low feed intake of the layers. Differences in HDP and FCR among the diets reflect the variation in ingredients used in formulating the commercial feeds and their consumption rate.

Table 2: Proximate composition of the commercial feeds

Parameters (%)	CKM	TFM	ABM	ACM	SEM	P-value
Crude Protein	17.40 ^a	14.91 ^c	15.62 ^b	17.41 ^a	0.02	0.01
Ether extract	4.71 ^a	4.11 ^b	2.50 ^d	4.50 ^c	0.01	0.001
Moisture	6.56 ^d	7.30 ^b	7.70 ^a	6.63 ^c	0.01	0.001
Crude fibre	4.09 ^c	5.18 ^a	3.69 ^d	5.09 ^b	0.02	0.001
Ash	19.47 ^a	14.43 ^c	18.53 ^b	13.30 ^d	0.01	0.001
Nitrogen Free Extract	47.77 ^d	54.07 ^a	51.96 ^c	53.07 ^b	0.02	0.02

^{a,b,c,d} – Means on the same row having different superscripts are significantly ($P < 0.05$) different.

SEM – Standard Error Mean

Table 3: Performance of birds fed the commercial feeds

Parameters	CKM	TFM	ABM	ACM	SEM	P-value
Initial Weight (kg/bird)	1.34	1.34	1.34	1.33	0.01	0.97
Final Weight (kg/ bird)	1.53 ^b	1.60 ^a	1.65 ^a	1.59 ^{ab}	0.01	0.02
Weight Gained (kg/ bird)	0.19	0.26	0.31	0.25	0.02	0.22
Feed Intake (g/bird/day)	100.61 ^d	123.96 ^a	119.18 ^b	105.50 ^c	0.11	0.01
Total Egg Production (per bird)	15.07 ^d	19.27 ^a	15.87 ^c	16.47 ^b	0.02	0.01
Hen Day Production (%)	43.33 ^d	55.04 ^a	45.33 ^c	47.04 ^b	0.05	0.01
Feed Conversion Ratio	2.40 ^c	2.32 ^b	2.71 ^d	2.30 ^a	0.02	0.01

^{a,b,c,d} – Means on the same row having different superscripts are significantly ($P < 0.05$) different.

SEM – Standard Error Mean

CONCLUSION

The comparative analyses of four commercial diets using performance of laying birds as response criteria showed that the feeds were of good nutritional qualities with reference to the

weight gain, Hen Day Production (HDP) and Feed Conversion Ratio. However, birds fed TFM had the highest total egg produced and HDP.

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