EFFECTS OF PROPRIETARY FEEDS AND DIETARY INGREDIENT SELECTION ON PERFORMANCE OF BROILER CHICKENS

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ABSTRACT

Two hundred and forty (240) four weeks old Hubbard broiler chicks were used in a choice-feeding trial to investigate whether meat-type chicken could select adequate nutrients that would optimize growth, from a choice of commercial feeds and feed ingredients. Four diets were used: a control diet (on-farm feed) and three test diets (commercial feeds). The diets were fed singly. The diets were also used in a choice-feeding with ground maize and soyabean meal (SBM). The study lasted for 4 weeks and the response criteria were growth performance (weight gain, feed intake and feed conversion ratio). The final live weight, weight gain and feed consumption of the chickens were significantly influenced ($P<0.05$) by the experimental treatments. Feed consumption of chickens offered choice of dietary maize and SBM was significantly higher ($P<0.05$) than those of chickens without supplementary maize and SBM. Chickens offered the control diets had higher weight gain ($P>0.05$) than those offered the commercial feeds. Weight gain increased when chickens were offered supplemental feed ingredients, irrespective of the diets. Calculated crude protein (CP) intake showed higher CP intake by choice-fed chickens compared with those fed only the compounded diets. Proportionately, more maize was selected compared to SBM by chickens offered supplementary feed ingredients. Higher weight gain of the chickens was recorded with higher CP intake. The potential of broiler chickens to select feed ingredients to compensate for imbalances in compounded rations was exhibited, especially for enhanced weight gain. Thus, where quality of proprietary feed is in doubt, provision of ground maize and soyabean meal would ameliorate the adverse effect of such feeds.

Keywords: *Broiler chickens, proprietary feed, choice-feeding, performance.*

INTRODUCTION

Poultry production in Nigeria has witnessed series of development in the field of nutrition. In the poultry industry, feed often constitutes the single most important determinants of the success of operations as the feed accounts for over 70 % of total cost of production (Fink- Gremmels, 2004). Majority of animals in the wild are able to select diet most suitable to their needs by choosing between a wide variety of feedstuffs (Krebs and Davis, 1981). When two or more types of diets which have different colours, smell, forms and nutritional characteristics are available at the same time, poultry can select what they need to meet their requirements. This ability is named nutritional wisdom (Shariatmadari and Forbes, 1993). Reported evolutionary trend in choice-feeding includes selection for long-term survival benefit by chickens (Siegel *et al.*, 1997) and distinguishing between feeds which contain toxins and those which are harmless (Moss, 1991). Raising broilers to marketable weight at short period would be difficult under the Nigerian situation of fluctuating feed quality. Choice feeding may provide a strategy for improving performance and reducing the need for frequent feed formulation, and also in situations of questionable quality of proprietary broiler feeds. Therefore, this study was designed to investigate if broilers could select a balanced diet to meet their nutrient requirements when provided with a choice of compounded diets (commercial feeds) and feed ingredients (maize and soyabean meal).

MATERIALS AND METHODS

The study involved the use of 4 experimental diets (A, B, C and D) and the choice of ground maize and soyabean meal (SBM). Diet A was a standard formulated diet for broiler-chicken finishers while Diets B, C and D were selected commercial broiler finisher feeds procured from reputable commercial feed distributors in Akure, Ondo State. Maize and SBM were selected as the energy and protein supplements respectively, for choice feeding. A total of 240 birds were selected and randomly assigned to one of the 8 experimental treatments. The treatments were:

T1 – Diet A (Control)
T2 – Diet B (commercial feed 1)
T3 – Diet C (commercial feed 2)

T4 – Diet D (commercial feed 3)
T5 – Diet A + choice of ground maize and SBM
T6 – Diet B + choice of ground maize and SBM
T7 – Diet C + choice of ground maize and SBM
T8 – D + choice of ground maize and SBM

There were 3 replicates per treatments and 10 birds per replicate. Each replicate comprised 5 males and 5 females. The birds were placed on the experimental treatments for 4 weeks. Maize and SBM were provided in separate feeding troughs for birds in treatments T5, T6, T7 and T8. The feeding troughs had hood that prevented spillage. Feed and water were provided *ad-libitum* throughout the period of the experiment. Daily feed consumption and weekly live weights of the birds were recorded. Data were subjected to one-way analysis of variance (ANOVA) using the Minitab Statistical Package. Significant differences between treatment means were separated using the least significant difference (LSD) of the same statistical package.

RESULTS

Table 1 shows the growth performance of the experimental birds. Initial live weights of the chicks were not significantly different ($P>0.05$). The final live weight, weight gain and feed consumption were significantly influenced ($P<0.05$) by the treatments. Chickens fed T7 and T8 had significantly ($P<0.05$) higher final live weight and weight gain compared the other treatments. Feed consumption of chickens offered choice of dietary maize and SBM (T5 - T8) was significantly higher ($P<0.05$) than those of chickens without supplementary maize and SBM (T1 – T4). Feed conversion ratio (FCR) was significantly ($P<0.05$) lowest for chickens on T1, T3, T4, T7 and T8). Calculated crude protein (CP) intake, based on intake of compounded diets, maize and SBM showed higher CP intake by choice-fed chickens (T5 –T8) compared with those fed only compounded diets (T1 – T4). Proportionately, more maize was selected compared to SBM by chickens offered supplementary feed ingredients. Higher weight gain of the chickens was recorded with higher CP intake.

DISCUSSION

Supplementing the compounded diets with the feed ingredients (T5 – T8) led to better performance of the chickens, revealing additional benefit from nutrient supplied to the chickens on these treatments. Supplemental feed ingredients selection pattern by chickens revealed a tendency of selecting proportionately more maize than SBM. Weight gain of the chickens on diet T7 and T8 was reflection of their CP intake, compared with those on other diets had. This could be attributed to superior nutrient quantity and quality in terms of supplemental feed ingredients. Diets T1 and T4 did not meet CP requirement of broiler finisher. Although, chickens would eat primarily to satisfy their energy requirement, Holcombe *et al.* (1975) reported the selection potentials of chickens to also meet dietary protein (essential amino acids) requirement.

CONCLUSION

The investigated commercial broiler finisher feeds optimized performance of the chickens but not at the same level as the on-farm control diet. Because CP requirement of the broiler birds was not met. The potential of broiler chickens to select feed ingredients to compensate for imbalances in compounded rations was exhibited, especially for enhanced weight gain. Thus, where quality of proprietary feed is in doubt, provision of ground maize and soyabean meal would ameliorate the adverse effect of such feeds.

REFERENCES

Fink-Gremmels, J. (2004). Quality Objectives in Animal Nutrition In: World Nutrition Forum. Biomin FGmbtt, Australia, 49-50.

Holcombe, D. J., Roland, D.A. and Harms, R.H. (1975). The ability of hens to regulate protein intake when offered a choice of diets containing different levels of protein. *Poultry Sci.*, 55:1731-1737.

Krebs, J.R. and Davies, N.B. (1981). An Introduction to Behavioural Ecology. Oxford Blackwell pp.60.

Moss, R. (1991). Diet selection - an ecological perspective. *Proc. Nutr. Soc.*, 50:71-75.

Shariatmadari, F. and Forbes, J.M. (1993). Growth and food intake responses to diets of different protein contents and a choice between diets containing two levels of protein in broiler and layer strains of chicken. *Br. Poultry Sci.*, 34: 959-970.

Siegel, P.B., Picard, M., Nir., L., Dunnington, E.A., Willemson, M.H.A. and Williams, P.E.V. (1997). Responses of meat-type chickens to choice-feeding of dietary diets differing in protein and energy from hatch to market weight. *Poultry Sci.*, 76:1183-1192.

Table 1: Performance of broiler chickens offered proprietary feeds and choice of dietary ingredients

Parameters	Treatments							
	T1	T2	T3	T4	T5	T6	T7	T8
Diets	A	B	C	D	A+	B+	C+	D+
Initial weight (kg/bird)	0.94±0.06	0.92±0.03	0.94±0.03	0.93±0.02	0.93±0.02	0.93±0.02	0.93±0.01	0.93±0.02
Final weight (kg/bird)	2.55±0.04^{bc}	2.41±0.21^{c}	2.39±0.06^{c}	2.47±0.07^{bc}	2.59±0.11^{bc}	2.48±0.20^{c}	2.67±0.13^{ab}	2.87±0.06^{a}
Weight gain (kg/bird)	1.63±0.33^{bc}	1.49±0.19^{c}	1.45±0.40^{c}	1.54±0.01^{bc}	1.66±0.11^{bc}	1.57±0.19^{bc}	1.74±0.12^{ab}	1.94±0.08^{a}
Feed consumption (kg/bird)	5.04±0.26^{c}	5.21±0.10^{bc}	5.02±0.12^{c}	4.98±0.10^{c}	5.80±0.32^{a}	5.74±0.27^{a}	5.96±0.26^{a}	5.57±0.36^{ab}
Feed conversion ratio	3.08±0.10^{a}	3.50±0.26^{b}	3.47±0.17^{ab}	3.24±0.10^{ab}	3.50±0.25^{b}	3.65±0.35^{b}	3.43±0.21^{ab}	2.87±0.22^{a}
Compounded diet intake (kg/bird)					1.65	1.09	1.28	1.55
Maize intake (kg/bird)					2.85	3.01	3.13	2.41
Soyabean meal intake (kg/bird)					1.30	1.64	1.55	1.61
Calculated crude protein intake (g/bird/day)	35.05	32.06	31.09	33.30	39.75	40.52	40.79	41.83

Mean ± Standard deviation, Means with different superscripts within the same row are significant (P<0.05), Crude protein contents of Diets and ingredients: A = 19.17%, B = 17.23%, C = 17.16%, D = 18.31%, Maize = 8.91% and SBM = 41.38%. + Provided with additional choice of ground maize and soyabean meal.