EFFECTS OF CHOICE FEEDING A COMPLETE FEED AND CORN ON THE PERFORMANCE OF BROILERS

A. H. Ramlah[1] and A. S. Halim

Department of Animal Sciences, Faculty of Veterinary Medicine
and Animal Science, Universiti Pertanian Malaysia
43400 UPM Serdang, Selangor, Malaysia

Summary

Poultry feeding systems are likely to change for increased efficiency of production. An experiment was conducted to compare the response of broilers to choice feeding of corn with a standard broiler ration. The treatments consisted of providing broiler feed as the only feed (SINGLE FEED) and access to corn as a choice to a complete broiler feed (CHOICE FEEDING). Weights and feed consumption were obtained at weekly intervals. Samples at the conclusion of the experiment were taken to determine the weight of abdominal fat.

Results showed that there was no significant difference in term of liveweight between the two feeding regimes. However, birds given a choice of the broiler feed and corn had better feed efficiency which is reflected by the lower total feed intake. Corn intake was 23.1% of total feed intake in the choice fed birds. In term of carcass colour, birds fed corn as a choice was observed to have a deeper yellow skin colour than the birds fed with broiler feed only.

(**Key Words**: Choice Feeding, Growth, Abdominal Fat, Broiler Performance)

Introduction

Meat-type chickens have traditionally been fed a balanced complete feed and given on an *ad libitum* basis. The current economics of the poultry industry indicate that food should be used as efficiently as possible and one of the method of achieving efficiency and reducing feed costs is to feed choices of grain with pelleted feed (Cowan and Michie, 1978; Scott and Heuser, 1957). On the other hand, the practice of choice feeding of split-diets, which were concentrated sources of either crude protein or energy in broilers was not beneficial as the birds on split-diets grew slowly as compared to the control (Summers and Leeson, 1978).

There are substantial reports of choice feeding studies with pullets, layers and breeders (Cowan et al., 1978; Farrell et al., 1981; Karunajeewa, 1978; Karunajeewa and Tham, 1984) but very few reported studies in broilers. The following experiment was conducted to study the response of broilers when offered corn as a choice with broiler diet.

[1]Address reprint requests to Dr. A. H. Ramlah, Department of Animal Sciences, Faculty of Veterinary Medicine and Animal Science, Universiti Pertanian Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

Received June 8, 1993
Accepted December 22, 1993

Materials and Methods

Animals and management

A total of 850 day-old broilers (Avian) were randomly distributed into 10 pens at a density of 0.13 m^2 per chick. The chicks were housed in a conventional broiler house with galvanized wire netting walls partitioned into twenty pens each measuring 3.0 m × 3.6 m. Only ten of the pens were used. The chicks were brooded for two weeks by the use of electric hovers. Wood shaving was used as bedding material with approximately 10 cm. in depth. All chicks were fed a crumbled starter diet of 22% crude protein and 12.13 MJ/kg ME for the first three weeks. The finishing pelleted diet, containing 19% crude protein and 12.55 MJ/kg ME, was fed from 22 to 49 days of age. The compounded feeds were obtained from a local feedmill. All groups were fed once daily using two hanging tube feeders (pan diameter of 42 cm). Water was provided by automatic bell-shaped drinker. Feed and water were provided *ad libitum*. The birds were managed under continuous lighting of 12 hours natural daylight and 12 hours supplemen-

tary lighting from 19:00 to 07:00 h.

Feeding regimes

The two feeding treatments were: (1) SINGLE FEED; *ad libitum* feeding of a broiler feed during the entire 49 days experimental period; (2) CHOICE FEEDING; coarsely ground corn was provided as a choice to a broiler feed from 15 days of age until 49 days. The corn was provided in a separate feed container as a choice to the broiler feed. Five replicate pens with 85 broilers per pen were utilized per treatment.

Traits measured

The birds were weighed on a per pen basis and feed consumption was recorded at weekly intervals. Feed conversion was calculated as feed/gain for the seven weeks. At the conclusion of the study, 10 birds from each treatment were selected at random, slaughtered and processed. The carcasses were then eviscerated and the abdominal fat pads removed as described by Cable et al. (1987). The carcasses and the abdominal fat pads were weighed, and expressed as a percentage of total body weight (grams per 100 g).

Statistical analyses

The analysis of variance using a computer software (Statgraphics®, 1988) was used to determine differences in treatment means and significance was assessed at the 0.05 level. When significance was found, means within treatments were separated using the Least Significance Difference test.

Results

A summary of the effects of choice feeding on broiler performance and protein and ME intakes is shown in table 1. There was no significant difference in term of final liveweight, daily liveweight gains, total feed intake, feed conversion ratio, mortality and abdominal fat weights between the two treatments. Although there was no significant difference in term of feed intake between the two treatments, there was a reduction of 4.26% in total feed intake of the choice fed birds as compared to the control. Also a lower mortality by 1.64% in the choice fed birds as compared to the single fed birds. Feed cost in the choice fed birds was 15.5% lower than the single fed birds.

In the choice fed birds, corn consumption was 23.1% of the total feed intake contributing 9.8 % of daily protein and 22.2% daily ME intakes.

TABLE 1. EFFECTS OF FEEDING CORN AS A CHOICE ON THE PERFORMANCE AND PROTEIN AND ME INTAKES OF BROILERS, DURATION OF 49 DAYS (MEANS±S.E)[1]

Variable	Single feed	Choice feeding
Final liveweight (g/b)	1,968.40 ± 32.14	1,952.60 ± 25.44
Liveweight gain (g/b/d)	39.32 ± 0.66	39.00 ± 0.51
Total feed intake (g/b)	4,040.26 ± 118.7	3,868.06 ± 210.4
Daily feed intake (g/b)	82.46 ± 2.41	78.94 ± 4.29
Daily protein intake (g/b)	15.86 ± 0.21	13.83 ± 0.32
Daily ME intake (kJ/b)	1,027 ± 16	1,007 ± 13
FCR (Feed/Gain)	2.10 ± 0.08	2.03 ± 0.13
Mortality (%)	6.58 ± 1.69	4.94 ± 0.58
Abdominal fat (%)	2.97 ± 0.12	2.86 ± 0.21
Feed cost (RM)	3.23	2.73

[1] Means ± Standard Error.
Means are not significantly different ($p > 0.05$).

Discussion

The feed intake between the two treatments was not significantly different, but the reduction in feed intake by the choice fed birds was 4.26% of the control. The reduced feed intake in choice-fed birds is consistent with the findings by Mastika and Cumming (1981). In the choice

fed birds, the intake of corn is 23.1% (table 2) of the total feed consumed and this is in agreement with the study by Scott and Heuser (1957) but less than that as reported by Cowan and Michie (1978) with a choice of wheat. The intakes of corn in the choice-fed birds contribute 9.8% protein and 22.2% ME of the total intakes of energy and protein by the birds. Also the average intake of corn (23.1%) could not be due to its yellow colour as in term of colour preference by the birds there was no difference between yellow and red coloured feed (corn and pelleted feed) as reported by Hurnik et al. (1971).

TABLE 2. FEED AND NUTRIENT INTAKES OF BROILERS GIVEN CHOICES OF FEEDS (CHOICE FEEDING GROUP)

Intakes	Broiler feed	Ground corn
Daily feed intake (g/b)	60.70	18.20
% of feed intakes	76.9%	23.1%
Daily protein intake (g/b)	12.47	1.36
% of protein intakes	90.2	9.8
Daily ME intake (kJ/b)	783.44	223.56
% of ME intakes	77.8	22.2

The total protein intake of the choice-fed birds is lower than the control. The ME intake was almost similar and is reflected in the abdominal fat weights, as there was no difference in term of abdominal fat weights between the two treatments. A reduction of feed cost by 15.5% could be achieved by feeding corn as a choice.

The success of choice feeding is attributed to the ability of the chicks to select a diet which provides it with all the nutrients necessary for maintenance and growth provided the sources of the choices were palatable, and in this case, corn could be considered as palatable.

Conclusions

Choice feeding of broiler feed with corn have a potential application in broiler chicken production especially with farmers practicing range rearing since there were no differences in term of performance between the two groups and also a saving in feed cost could be achieved with the feeding of corn as a choice.

Literature Cited

Cabel, M. C., T. L. Goodwin and P. W. Waldroup. 1987. Reduction in abdominal fat content of broiler chickens by the addition of feather meal to finisher diets. Poultry Sci. 66:1644-1651.

Cowan, P. J. and W. Michie. 1978. Choice feeding of the male and female broiler. British Poultry Sci. 19:149-152.

Cowan, P. J., W. Michie and D. J. Roele. 1978. Choice feeding of the egg-type pullet. British Poultry Sci. 19:153-157.

Farrell, D. J., R. Hamid and R. I. Hutagalung. 1981. Free-choice feeding of laying hens in the humid tropics. Trop. Anim. Prod. 6:22-29.

Hurnik, J. F., F. N. Jerome, B. S. Reinhart and J. D. Summers. 1971. Color as a stimulus for feed consumption. Poultry Sci. 50:944-949.

Karunajeewa, H. 1978. The performance of cross-bred hens given free choice feeding of whole grains and a concentrate mixture and the influence of source of xanthophylls on yolk colour. British Poultry Sci. 19:699-708.

Karunajeewa, H. and S. H. Tham. 1984. Choice feeding of the replacement pullet on whole grains and subsequent performance on laying diets. British Poultry Sci. 25:99-109.

Mastika, M. and R. B. Cumming. 1981. Performance of two strains of broiler chicken offered free choices from different ages. Proceedings of the Fourth Australasian Poultry and Stock Feed Convention. p. 97.

Scott, M. L. and G. F. Heuser. 1957. The value of grit for chickens and turkeys. Poultry Sci. 36: 276-283.

Summers, J. D. and S. Leeson. 1978. Dietary selection of protein and energy by pullets and broilers. British Poultry Sci. 19:425-430.

Statistical Graphics Corporation Inc. 1988. Statgraphics®, *Statistical graphics system*, STSC, Maryland, USA.