

Effect of Different Intermittent Feeding Regimes on the Performance of Broilers

Fawwad Ahmad, Ahsan ul Haq, Muhammad Ashraf, Muhammad Zubair Siddiqui and Hafiz Muhammad Ishaq

Department of Poultry Science, University of Agriculture, Faisalabad, Pakistan

Abstract

The study was conducted to evaluate the best restricted feeding regime that will be helpful in reducing the cost of production and increasing the profit margin. After providing 2 weeks of adjustment period one hundred and twenty broiler chicks were randomly divided into twelve experimental units having 10 chicks each. These replicates were further allotted to four treatment groups (A, B, C and D) in a way that three replicates were placed in each group. Group B, C and D were kept on intermittent feeding from 3rd to 6th weeks, 5th to 6th weeks and 3rd to 4th weeks, respectively while, group A (control) was kept on continuous feeding throughout the experimental period. The data of feed intake, body weight, dressing percentage, giblet weights was recorded during the experiment. Feed conversion ratio of group B was significantly better (1.70) than all other three groups A, C and D (1.95, 1.75 and 1.84, respectively). Abdominal fat was significantly lower in the birds kept under group B, whereas dressing percentage and giblet weight were remain non-significant among the experimental groups. The cost of feed/ Kg live weight of the birds kept under group B, C and D was Rs. 4.8, 3.6 and 1.44 less respectively than the birds kept under group A.

Key words: Broiler, Intermittent feeding, feed consumption, weight gain, feed conversion ratio.

Introduction

The diet of an average Pakistani national is very ill balanced and mostly composed of cereals and vegetables, generally deficient in protein especially of animal origin (Anonymous, 2007-2008). Animal protein sources like mutton is very expensive whereas, beef is high in cholesterol. The best and the cheapest way to get good quality protein with many other essential nutrients is from the meat of broiler. It is believed that 70 to 75% of the total expenditure on broiler production is incurred on feed (Hassan, 2002)

This indicates the importance of feed cost in broiler production.

Various methods of feed restriction can be used in broilers production to improve their efficiency and to reduce cost of production. This project was planned to study different feed restriction regimes in broilers. The results of the study are helpful to evaluate the best restricted feeding regime, that can reduce feed wastage and improve feed efficiency.

The objectives of the study were:

To investigate the impact of different intermittent feeding regimes on production performance of broilers and to study the effects of different restricted

feeding patterns on dressing percentage, weight of giblet and the economics of broiler production.

Materials and Methods

The study was carried out at the Poultry Research Center University of Agriculture, Faisalabad – Pakistan.

One hundred fifty (day old) broiler chicks (Hubbard) were purchased from a hatchery and were reared in a group for two weeks (adjustment period). At day fifteen the birds were weighed individually and one hundred twenty chicks of average weight were selected as experimental birds. These birds were randomly divided into twelve experimental units of ten chicks each. These replicates were further allotted to four treatment groups (A, B, C and D) in a way that three replicates were placed in each group. Group A served as a control and was fed ad-libitum (24 hour feeding). Where as group B, C and D were kept on intermittent feeding (one hour feeding and three hour off feeding) from 3rd to 6th weeks, 5th and 6th weeks and 3rd to 4th weeks respectively. The chicks were maintained in separate pens on deep litter under uniform managemental conditions. Fresh and clean drinking water was available to all chicks at all times.

The data on initial body weight, weekly body weight, weekly feed consumption were recorded and then were used to calculate weight gain and feed conversion ratio. At the end of experiment two birds from each replicate were randomly selected for the dressing percentage and for weight of giblet. The

Corresponding author: Fawwad Ahmad
Department of Poultry Science,
University of Agriculture, Faisalabad - Pakistan
Email: fawwad55@hotmail.com

economics under different intermittent feeding regimes was also calculated. The data thus collected were analyzed by Analysis of variance technique using Completely Randomized Design and the means were compared by Least Significance Difference test (Steel *et al.*, 1997).

Results and Discussion

Intermittent feeding had significant effect on weight gain, feed consumption and feed conversion ratio.

The average feed consumption during 3-4 weeks under treatments A, B, C and D was 1430, 1063, 1370 and 1093g, respectively. The birds in group A and C which were on continuous feeding consumed maximum feed while the bird in group B and D which were maintained on intermittent feeding consumed less feed during the experiment (Table 1).

The analysis of variance revealed significant ($P < 0.01$) effect of treatments on the feed consumption of broiler chicks during 3-4 and 5-6 weeks of age. The average feed consumption of chicks during 5-6 weeks was found maximum under treatment A (2293g) followed by those in treatments D (2003g) and C (1813g). The birds under treatment B consumed minimum amount of feed (1640g).

The average feed consumption during the overall experimental period (3-6 weeks) under treatments A, B, C and D was 3723, 2703, 3183 and 3096g, respectively.

The comparison of mean values through least significance difference test showed significantly higher overall feed consumption upto six weeks of age in chicks of group A relative to those in other three groups. The difference in feed consumption between the groups C and D was, however, non significant. Group "B" significantly consumed less feed as compare to other groups.

The results of the present study also coincide with the findings of Smith (1992) who reported that feed restriction resulted in decreased feed consumption.

The results of the present study are partially coincide with the findings of Lino *et al.* (1968) who reported that restricted feeding had little effect on feed consumption. This contradiction may be due to the method of feed restriction.

The average total weight gain during overall experimental period (3-6 weeks) under treatment A, B, C and D was 1985, 1586, 1816 and 1731g, respectively. The maximum weight gain of chicks was found in group A which served as control and remained on 24 hours feed while the lowest weight gain was observed in group B that was on intermittent feeding from 3-6 weeks of age.

The overall performance of chicks with respect to weight gain under group B was found not to be

satisfactory that might be due to under feeding throughout the experimental period from 3-6 weeks of age.

The results of the present study are in line with the findings of Cabel and Waldroup (1990) who studied the effect of feed restriction in broilers and reported a significant reduction in weight gain by feed restriction.

The results of present study are also in line with the findings of Palo *et al.* (1995) who conducted experiment to determine the effect of two early nutrient restriction and reported that restricted group birds were lighter than the birds without restriction. These results are not in line with the findings of Hassan (2002) who studied the effect of feed withdrawal during hot hours of the day on the performance of broilers and observed that restricted feeding enhance the weight gain. The difference in the findings of the study may be due to the intensity and duration of feed restriction.

The average overall feed conversion ratio (FCR) throughout the experimental period 3-6 weeks under treatments A, B, C and D was 1.95, 1.70, 1.75 and 1.84, respectively. The feed conversion ratio of chicks for the overall experimental period under treatment B and C remained the best while it was the poorest for the birds kept in group A.

The apparent trend of FCR of the present study showed that the birds kept on intermittent feeding plans utilized their feed more efficiently than those fed *ad-libitum* (control). However, the differences in FCR of groups C and D showed that intermittent feeding was more beneficial when it was conducted during 5-6 week instead of 3-4 week.

The results of present study are in line with the finding of Lee and Leeson (2001) Zubair and Leeson (1994) who observed the better feed efficiency in broilers kept on restricted feeding as compared to those fed *ad-libitum*. Whereas, better FCR is further dependent on the duration of feed restriction as well as the stage of feed restriction, as the results of present study reveals that overall FCR was significantly better in group C when intermittent feeding was applied during 5-6 weeks of age than group D treated with intermittent feeding during 3-4 weeks.

The dressing percentage of the groups A, B, C and D were 66.85, 65.85, 66.51 and 66.34, respectively (Table 2). Statistical analysis of data showed non-significant differences between the dressing percentage of the birds of different treatment groups. The results of present study are in line with the findings of Azhan (1984) who studied the influence of restricted feeding on the dressing percentage in broiler chicks and observed that

dressing percentage among different groups kept on different schedules of fasting were not different

The average relative weight of broilers heart at the age of 6 weeks in groups A, B, C and D was 0.42, 0.48, 0.41 and 0.42 g/100gm of body weight, respectively.

Statistical analysis of the data indicated that feeding treatment had non significant effect on the relative heart weight of birds under study. Similar result have been observed by Hollands *et al.* (1965) who reported that liver, heart and spleen weight were not affected in the birds maintained on feed restriction program.

The average relative liver weight of broilers at age of 6 weeks in group A, B, C and D was 2.97, 2.66, 2.78 and 2.77 g/100gm of body weight, respectively.

Statistical analysis of the data showed that neither *ad libitum* nor restricted feeding had any effect on the relative liver weight of the birds under study. Similar results have been observed by Hollands *et al.* (1965) who reported that liver, heart and spleen weight were not affected in the birds maintained on feed restriction program.

The average relative gizzard weight of broilers at the age of 6 weeks in groups A, B, C and D was 1.60, 1.37, 1.49 and 1.43 g/100gm of the body weight, respectively.

Statistical analysis of data showed that neither *ad libitum* feeding nor restricted had any effect on the relative gizzard weight of the birds under study. Results of this study are in line with the findings of Hussain (1977) who observed that the weight of the digestive tract organ with or without their content kept on different schedule of fasting was not different.

The average relative spleen weight of broilers at the age of 6 weeks in groups A, B, C and D was 0.15, 0.13, 0.12 and 0.14 g/100gm of body weight, respectively.

Statistical analysis of data did not show any difference between *ad libitum* and feed restricted birds. Similar results have been observed by Hollands *et al.* (1965) who reported that liver, heart and spleen weight were not affected in the birds maintained on different feed restriction programs.

The average abdominal fat weight of broilers at the age of 6 weeks in groups A, B, C and D was 2.97, 1.67, 2.59 and 2.29 grams, respectively.

Statistical analysis of data showed significant difference regarding abdominal fat between *ad libitum* and in restricted feeding program. The results of present study coincide with the findings of Plavnik and Hurwitz (1985) who reported that feed restriction reduces the abdominal fat. The results are not supported by Zubair and Leeson (1996) who reported that none of feed restriction programs reduced the average amount of abdominal fat when compared

with full-fed control broilers. The contradiction may be due to the methods or the duration of feed restriction, because in the present study the results shows that abdominal fat was significantly differ among the various treatment groups depending upon the stage of application at which intermittent feeding was applied.

The economics of feeding the broilers kept under various feeding regimes is presented in Table 3. Cost of feed/Kg of live weight of the birds kept under group A was more (Rs. 45.6) than the birds kept under group B(Rs. 40.8), C(Rs. 42) and D(Rs. 44.16). The cost of feed/ Kg live weight of the birds kept under group B,Cand D was Rs. 4.8, 3.6 and 1.44 less respectively than group A. The results indicated that appropriate use of feeding methods may reduce the cost of production even same method of feed restriction are used.

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Table 1: Average Feed Consumption (g), Weight Gain (g) and Feed Conversion Ratio of Experimental Chicks during Starter, Finisher and Overall Period.

Age	Feed Consumption (g)				Weight gain (g)				Feed Conversion Ratio			
	A	B	C	D	A	B	C	D	A	B	C	D
(3-4 weeks)	1430 ^a	1063 ^b	1370 ^a	1093 ^b	869 ^a	700 ^b	846 ^a	709 ^b	1.68 ^a	1.51 ^b	1.67 ^c	1.54 ^b
(5-6 weeks)	2293 ^a	1640 ^d	1813 ^c	2003 ^b	1116 ^a	886 ^d	970 ^c	1022 ^b	2.05 ^a	1.77 ^c	1.86 ^b	1.95 ^c
Overall (3-6 weeks)	3723 ^a	2703 ^c	3183 ^b	3096 ^b	1985 ^a	1586 ^d	1816 ^b	1731 ^c	1.95 ^a	1.70 ^c	1.75 ^c	1.84 ^b

Values within same row with different superscript are significantly ($P < 0.05$) different.

Group A: (Control) fed ad-libitum 24 hour feeding through out the experimental period.

Group B: Intermittent feeding (one hour feeding and three hour off feeding) from 3rd to 6th weeks

Group C: Intermittent feeding (one hour feeding and three hour off feeding) from 5th and 6th weeks

Group D: Intermittent feeding (one hour feeding and three hour off feeding) from 3rd to 4th weeks

Table 2. Dressing Percentage and Average Relative Weight [(Organ Weight / Body Weight) X 100] of Heart, Liver, Gizzard, Spleen and Abdominal fat of Broilers at 6 Weeks of Age.

Description	Treatments			
	A	B	C	D
Dressing percentage	66.85	65.85	66.51	66.34
Heart	0.42	0.48	0.41	0.42
Liver	2.97	2.66	2.78	2.77
Gizzard	1.60	1.37	1.49	1.43
Spleen	0.15	0.13	0.12	0.14
Abdominal fat weight	2.97 ^a	1.67 ^d	2.59 ^b	2.29 ^c

Values within same row with different superscript are significantly ($P < 0.05$) different

Table 3. Economics of Feeding

Factors	Treatment Groups			
	A	B	C	D
Feed consumption per bird (Kg)	3.732	2.703	3.183	3.096
Feed Conversion Ratio	1.9	1.7	1.75	1.84
Weight gain/Bird (Kg)	1.985	1.586	1.816	1.731
Feed consumption per bird (Kg)	3.7715	2.6962	3.178	3.18504
Feed Cost/kg (Rs.)	24	24	24	24
Feed Cost /Kg of Live Weight (Rs.)	45.6	40.8	42	44.16

Group A: (Control) fed ad-libitum 24 hour feeding through out the experimental period.

Group B: Intermittent feeding (one hour feeding and three hour off feeding) from 3rd to 6th weeks

Group C: Intermittent feeding (one hour feeding and three hour off feeding) from 5th and 6th weeks

Group D: Intermittent feeding (one hour feeding and three hour off feeding) from 3rd to 4th weeks