Effect of early feed restriction on broilers performance

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Abstract

An experiment was carried out with straight run broiler chicks (Hubbard) in which commercial feed from 11 to 18 days of age was restricted to 100, 90, 80, and 70% in groups A, B, C, and D respectively. Each treatment had 3 replicates, having 30 chicks each. The results indicated that feed restricted with 70 & 80 % resulted in a significant ($P<0.05$) reduction in body weight at the age of 18 days. After return to adlib feeding the birds were fully recovered from their body weight depression. Comparable increase in all growth parameters (body weight, feed intake & FCR) were observed in birds fed on restricted diets in week 2 and 3. However in last week, the significant improvement ($P<0.05$) in weight gain was noted in group B (90% restriction) but FCR was significantly improved in group D (70% restriction) when compared with control.

Introduction

When an animal, whose growth has been related by dietary restriction, is given adequate nutrition, it grows at a faster rate than an animal of the same age that had not been subjected to restriction. (Jones & Farrel, 1992). Al-Taleb (2003) reported that feed restriction programme applied to broiler chickens have produced varied response with respect to growth performance (body weight, feed efficiency and carcass fat). Other factors such as severity, timing, and duration, feed intake during period of refeeding, sex, or strain may affect the subsequent ability of broiler chicken to recover from a growth deficit (Yu and Robinson, 1992).

This study was conducted to investigate the effect of early-life feed restriction compared to full feeding until marketing age on productive performance.

Materials and Methods

Unsexed 120 day old broiler chicks (Hubbard) were brooded together for the first 10 days on deep litter and were fed adlib commercial starter diet. On 11th day, these chicks were divided into four treatments designated, A, B, C & D. Each treatment had 30 chicks with three replicates of 10 chicks each. The following treatments were given:

Treatment	Restriction percentage
A (control)	*Ad libitum* feed
B	90% of the *Ad libitum*
C	80% of the *Ad libitum*
D	70% of the *Ad libitum*

The 70, 80 & 90% of the feed quantity was calculated on the previous day feeding of adlib i.e day 10. The feed restriction started from day 11 to 18, after that chicks were weighed and fed commercial feed till the market age (42 days). Body weight, feed intake were recorded weekly to calculate Feed Conversion Ratio (FCR). The data collected was subjected to Analysis Of Variance (Steel & Torrie, 1980).

Results and Discussions

Feed restriction resulted significant effect on weight gain i.e. in first week birds fed on 70 and 80% of *ad libitum* had significantly lower body weight (Table 1). Whereas 90% restriction resulted numerically lower but statistically similar body weight to that of 100% feeding. A 25 to 35% reduction in weight gain was due to lower amount of nutrient available as a result of quantitative feed restriction. Compensation for this reduction was achieved in following weeks.

Performance of broiler fed on normal intake after restriction 11-18 day is represented in Table 1 & 2. Birds on restricted feed consumed higher feed at all restriction levels when compared to *ad libitum* feed during week 2-4. Although birds consumed slightly more feed and utilized that feed with relatively poor efficiency on 90 and 80% restriction but 70% restriction showed better feed conversion ratio compared to ad lib fed birds. Poor utilization of feed at less severe restriction level is in line with the findings of Rincon (2000), who reported that less severe (90%) restricted birds did not have better Apparent Metabolisable Energy (AMEn) than those ad lib birds. Getting better energy (feed) utilization need severe restriction in feed intake.

Growth performance in week 3 (Table 2) showed increased weight gain on all restriction levels. Birds on restriction consumed almost similar amount of feed but consumed feed was utilized with better efficiency than full feeding though statistically non significant ($P>0.5$). In third week, bird on restriction of 90, 80 and 70% gained higher weight compared to full fed group. Our results do not agree with the results of Plavnik and Hurwitz (1985), possibly because of longer restriction period imposed by them i.e. week 2 and week3. In week 4, the final average weights were 1.5, 1.6, 1.5 and 1.5 kg for treatment A, B, C and D respectively, indicating non significant weight gains in final week.

Early feed restriction up to 70% seems to be practical solution to economize broiler production. Bird restricted at early age (11 to 18 days) were able to compensate body weight reduction due to early feed restriction at their market age. The better performance could be the outcome of better utilization of nutrient from the feed consumed. A significant reduction in weight at 11-18day restriction was equalized to *ad libitumn* group in third week of feeding. Feed restriction upto 70% was compensated equally good as 80 and 90%. Hurwitz *et al* (1980) suggested that in order to produce a leaner body mass the body expend 0.5-0.7 kcal ME/g gain. It was hypothesized that energy and other nutrient needed to maintain compensatory growth comes from reduction in maintenance requirements of under fed birds. Because under fed birds had lower body weight at restriction and consequently reduced metabolic size (Zubair and Leeson 1994).

This study indicated that early feed restriction has improved the efficiency which is not seen on full feeding and this economical benefit was obvious with every increment in feed restriction i.e. from 90-70%. Results of the present study will help the broiler grower to economize their broiler production along with reduced mortalities and other metabolic problems. It also indicate that maximum feed intake in present day broiler does not ensure efficient weight gain.

References

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Table 1: **The effect of varying levels of feed restriction 11 to 18 days of age followed by full feeding on the growth performance of broilers (Week 1-2).**

Treatments	Week 1			Week 2		
	Wt. Gain (gm)	Feed Intake (gm)	FCR	Wt. Gain (gm)	Feed Intake (gm)	FCR
A: adlib	262.4[a]	479.5[a]	1.8[a]	467.6[a]	814.5[a]	1.8[a]
B: 90%	246.7[a]	443.7[b]	1.8[a]	429.3[a]	896.6a	2.1[a]
C: 80%	199.7[b]	400.0[c]	2.0[a]	433.2[a]	885.8[a]	2.1[a]
D: 70%	171.5[b]	350.0[d]	2.0[a]	466.2[a]	842.4[a]	1.8[a]

Same superscripts on means show non-significant difference (P>0.5).

Table 2: **The effect of varying levels of feed restriction 11 to 18 days of age followed by full feeding on the growth performance of broilers (Week 3-4).**

Treatments	Week 3			Week 4		
	Wt. Gain (gm)	Feed Intake (gm)	FCR	Wt. Gain (gm)	Feed Intake (gm)	FCR
A: adlib	276.2[a]	779.0[a]	3.3[a]	209.3[a]	679.8[a]	3.3[a]
B: 90%	395.7[a]	862.2[a]	2.2[a]	279.3[a]	743.2[b]	2.6[a]
C: 80%	346.6[a]	799.8[a]	2.3[a]	263.7[a]	695.2[b]	2.7[a]
D: 70%	400.3[a]	777.3[a]	1.9[a]	209.7[a]	786.7[a]	3.2[a]

Same superscripts on means show non-significant difference (P>0.5).