RESPONSE OF BROILERS TO A RESTRICTION IN FEEDING TIME

ENGKU AZAHAN*

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INTRODUCTION

Feed accounts for some 70% of the total broiler production cost. The high cost of the feed coupled with small profit margin emphasize the need for maximising the economic efficiency of feed utilization. In this context the manipulation of feed intake of broilers by restricting their access to feed may be an important factor when considering techniques to improve growth rate and lower feed conversion efficiency in such rapidly-growing animals as the broiler chickens. Such a manipulation might present a possible way of reducing production cost.

The response of different categories of chicken to restricted feeding has been variously reported. In laying hens, the practice of restricting feed intake is now an accepted management procedure. With commercial egg and broiler breeder pullets various methods of restricting the feeding of replacement stock have been employed to improve reproductive performance by delaying sexual maturity and reducing obesity (GOwe, JOHNSON, CRAWFORD, DOWNS, HILL, MOUNTAIN, PELLETIN and STRAIN, 1960; FULLER and DUNAHoo, 1962; FULLER, KIRKLAND and CHANEy, 1973). In broiler chickens restricted feeding has been shown in many instances to improve feed conversion efficiency and in some cases body weight too (MCdANIEL, FLOOD and KooN, 1975; MCcARTNEY and BROWN, 1977; Holder, JONES and HALE, 1977; BEANE, CHERRY and WEAVER, 1977). A negative or non-responsive response has also been reported (WARD, 1972; GOUS and STIELAN, 1976; TUTEN, 1976).

Under the hot and humid tropical climate of Malaysia, responses to restricted feeding of broiler chickens reared in conventional open-type houses are not known. This paper reports on a preliminary trial conducted to examine the response of broiler chickens to a restriction in feeding time under Malaysian conditions.

MATERIALS AND METHOD

Two hundred and seventy-six straight-run broiler chicks of a commercial broiler strain were employed in the study. They were reared in a conventional open-type raised wire-floor broiler house and were randomly divided into two equal treatment groups. Each group was separated into three equal replicates.

All experimental birds were provided broiler starter mash for four weeks followed by finisher feed until the trial terminated at the eighth week. The rations were formulated and mixed at MARDI farm (Table 1).

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Table 1. Experimental rations

<table>
<thead>
<tr>
<th>Composition</th>
<th>Starter (0-4 weeks), %</th>
<th>Finisher (5-8 weeks), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>52.90</td>
<td>54.25</td>
</tr>
<tr>
<td>Wheat pollard</td>
<td>10.00</td>
<td>15.50</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>28.00</td>
<td>21.00</td>
</tr>
<tr>
<td>Fish meal</td>
<td>6.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Palm oil</td>
<td>1.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Trimix</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Tricalcium phosphate</td>
<td>0.75</td>
<td>1.00</td>
</tr>
<tr>
<td>Salt</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>DL-methionine</td>
<td>0.20</td>
<td>0.05</td>
</tr>
<tr>
<td>Elancoban</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>TM 50</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Choline</td>
<td>0.20</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Calculated protein and energy

<table>
<thead>
<tr>
<th></th>
<th>Starter (0-4 weeks), %</th>
<th>Finisher (5-8 weeks), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude protein, %</td>
<td>22.1</td>
<td>19.7</td>
</tr>
<tr>
<td>Metabolisable energy, kcal/kg</td>
<td>2 939</td>
<td>2 983</td>
</tr>
</tbody>
</table>

Light was made available 24 hours daily during the two-week brooding period after which all birds were subjected to 12 hours natural day-light (0700 hours – 1900 hours).

Food and water were provided ad libitum during the first two weeks of brooding. Feed restriction commenced on the fifteenth day and continued until the completion of the trial period (56 days). The restriction schedule consisted of withdrawing feed daily for six hours from 1000 hours to 1600 hours. Birds in the control group had free access to feed at all times throughout the trial period.

Standard vaccination programme was provided to all birds and this consisted of F vaccination at day-old, fowl pox vaccination at three weeks and the standard or S vaccination at six weeks.

Feed intake, body weight gain and feed conversion efficiency were recorded and calculated over eight weeks while mortality was recorded daily. The general behaviour and the physical condition of both the control and treatment birds were observed during the day time as well as at night.

At the end of the trial period 12 birds from the control group and the same number from the treatment group were randomly sampled for carcass analysis. These samples comprised equal number of males and females. The procedure for carcass preparation was as described by ENGKU AZAHAN (1984). The data recorded were eviscerated yield, meat plus skin weight, bone weight, per cent dressing and meat plus skin-to-bone ratio.

RESULTS AND DISCUSSION

Under the experimental conditions of natural daylight hours (0700 hours – 1900 hours) the consumption of feed in the control was observed to be more in the early and late hours of the day. At the other periods feed consumption was relatively low although 'nibbling' of feed occurred throughout the daylight hours. This observation was consistent with that reported by ENGKU AZAHAN.
(1983) and other workers. SAVORY (1976) and MASIC, WOOD-GUSH, DUNCAN, MCCORQUODALE and SAVORY (1974) reported that chickens consumed most at the end of the day while SIEGEL and GUHL (1956) and DUNCAN, HORNE, HUGHES and WOOD-GUSH (1970) reported that most of the consumption occurred at the beginning of the day. In the case of treatment birds most of the feed consumed was at the beginning of the day and immediately after the six-hour restriction period. At night there was practically no consumption in both groups of birds and they were almost inactive. Observations of the crops of the birds did not reveal any apparent abnormality, either in the control or the treatment birds. This was in contrast to the observation made by PROUDFOOT and HULAN (1982) who observed that birds subjected to reduced feeding had a tendency towards enlarged or pendulous crops.

In this study feed intake was significantly depressed (P< 0.01) by restriction of six hours per day during the natural daylight period (Table 2). This was consistent with the findings of MCDANIEL et al. (1975), CONARD and KUENZEL (1978), WASHBURN and BONDARI (1978) and YULE and FUELLING (1979). Some nine per cent less feed was consumed by birds in the restricted group, in close agreement with the result of MCDANIEL et al. (1975) who reported a saving of about 10% of feed with restriction.

Restriction of feeding time did not have any significant effect on body weight gain of birds (Table 2). This was consistent with the findings of MCDANIEL et al. (1975), MCCARTNEY and BROWN (1977) and HOLDER et al. (1977). YULE and FUELLING (1979) observed the same for birds raised on litter but not in cages. In contrast, improvements in body weight gain were reported by WAGSTAFF (1976) and CONARD and KUENZEL (1978). These workers however, subjected their birds to a controlled feeding programme on high-energy diets (metabolisable energy of more than 3 400 kcal/kg). The diets used in this study were only of medium energy concentration and this probably explained the contradiction in growth rate results. The restriction employed in this study could be considered mild since it was imposed only during the non-peak period of the diurnal feeding pattern. With severe restriction, depressed growth might be observed as reported by MCCARTNEY and BROWN (1977), CONARD and KUENZEL (1978) and YULE and FUELLING (1979).

Feed conversion efficiency was significantly improved (P<0.05) by food denial (Table 2). This was consistent with the findings of PROUDFOOT and HULAN (1982), YULE and FUELLING (1979), YULE, BARRAM and BURTON (1979), FARRANT (1976), TUTEN (1976), MccARTNEY and BROWN (1977) and WAGSTAFF (1976) but contradicted the results reported by WARD

Table 2. Production performance and carcass yield at eight weeks

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Treatment</th>
<th>Control</th>
<th>Restricted</th>
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<tbody>
<tr>
<td>Feed intake (g)</td>
<td>4 734</td>
<td>4 324**</td>
<td></td>
</tr>
<tr>
<td>Body weight gain (g)</td>
<td>1 773</td>
<td>1 766</td>
<td></td>
</tr>
<tr>
<td>Feed efficiency</td>
<td>2.67</td>
<td>2.45*</td>
<td></td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>0</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Per cent dressing</td>
<td>68.2</td>
<td>68.9</td>
<td></td>
</tr>
<tr>
<td>Meat + skin : bone</td>
<td>3.20</td>
<td>3.56</td>
<td></td>
</tr>
</tbody>
</table>

*Significantly different at 5% level in the same row of figures.
**Significantly different at 1% level in the same row of figures.
(1972) and HOLDER et al. (1977). WARD (1972) observed a decline in feed conversion efficiency in birds restricted of feed on a weekly basis (9, 24 and 48 hours per week) which could have represented a more severe condition. The negative influence of severe restriction in feeding time was also mentioned by YULE and FUELLING (1979). HOLDER et al. (1977) on the other hand treated his birds to two-hour feed restriction twice daily and did not observe any significant effect. Such a treatment was probably too mild to have any significant influence not only on feed conversion efficiency but also on the overall growth performance since body weight was reported to be unaffected too.

Mortality was generally low. In the control, no death was recorded while in the treatment group only four deaths were observed (2.7%). Similar observations were made by YULE and FUELLING (1979), YULE et al. (1979) and PROUDFOOT and HULAN (1982).

Carcass quality was not affected by treatment (Table 2). The dressing percent-
age obtained for birds from both groups corresponded to figures normally reported for broilers in Malaysia (ENGKU AZAHAN and JAMALUDIN JAYA, 1982; ENGKU AZAHAN, 1984).

In general, the favourable effect of a restriction in feeding time observed in this study was in agreement with the reports of many findings elsewhere. It appears that eating followed by reduced activity is important for improvement of feed conversion efficiency so long as the denial of food was not too severe. The benefits obtained through feed saving and improved feed conversion (8% – 9%), though small, suggest that this is one way to improve feed utilization by broilers.

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SUMMARY

A total of 276 straight-run commercial broiler chicks were employed in a trial to determine the effect of a restriction in feeding time on production performance and carcass yield. Under the natural environmental condition of 12 daylight hours and 12 hours of darkness in a day, feed was denied to treatment birds for six daylight hours (1000 hours to 1600 hours) daily from the age of 15 days till the completion of the trial (56 days). Restricting the feeding time significantly affected feed intake and feed conversion efficiency. There was a saving of 8.7% feed and an improvement of 8.2% in feed conversion efficiency made by feed-restricted birds. Body weight gain, mortality, dressing percentage and meat plus skin-to-bone ratio were not significantly affected.

REFERENCES


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