PERFORMANCE OF COMMERCIAL BROILERS UNDER DIFFERENT INTERMITTANT LIGHTING PROGRAMS

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ABSTRACT

An experiment was conducted to study the effect of intermittent lighting program on the performance and carcass yield of commercial broilers. The light treatment from 14 days onwards up to 42 days was given as 23 hr light and 1 hr darkness for continuous light program and 4 hr light and 2 hr darkness intermittently for intermittent light program. The results indicated that there was no significant difference in body weight at 14, 35 and 42 days of age in both treatments. Continuous lighting produced significantly higher body weight at 21 and 28 days of age. Feed conversion efficiency (FCR) did not differ significantly at 14, 21, and 28 days of age. But it was significantly better in intermittent lighting regime after 35 days of age. Carcass yield and drumstick were significantly higher for intermittent lighting treatment. Continuous light treatment produced significantly higher fillets and tenders at 42 days of age.

KEY WORDS : broilers, Continuous light, Intermittent light, , body weight, FCR, carcass yield.

INTRODUCTION

Broilers are commonly reared under continuous lighting schedule. However, the suitability of such lighting regimens may be questioned in terms of performance and welfare. Final body weight at market age of broilers reared under intermittent light schedules are equal to, or even higher than, those of broilers reared under continuous lighting schedules (Buyse *et al.,* 1996). While fluorescent light does not affect broiler performance adversely, lower use of electricity compared with incandescent lighting reduces input costs(Deaton *et al.,* 1981). The objective of the present study was to compare the influence of intermittent lighting on broiler performance and carcass yield. Lighting program with reduced photoperiods are considered essential for the stimulation of locomotor activity and the development of a circadian rhythm in the birds. Extended dark periods, however, reduce growth when applied in the first weeks of age (Bessei, 2006).

MATERIALS AND METHODS

The experiment was conducted under the field conditions in a commercial broiler poultry farm at Sirsi, Uttara Kannada district in Karnataka during June 2014. For this experiment 400 broilers chicks of Vencobb strain were divided in eight pens of 50 each, which were used as four replicates of each treatment. Standard management and nutritional practices were followed. The chicks were given 1 sq. ft. floor space each in deep litter and were allowed *ad. lib*. access to feed and water. The crumbled starter ration (23% CP and 3160 K Cal/kg ME) was provided from 1-21 days of age and finisher ration (21% CP and 3245K Cal/kg ME) was provided from 21-42 days of age. The duration of the experiment was from 2 weeks of age to 6 weeks of age. Birds were housed in open sided houses. 12 hr natural daylight was kept constant. Fluorescent tubes with uniform light intensity were provided. For continuous lighting treatment the photoperiod provided during night was 11 hrs of light and 1 hr of darkness i.e. from 18.00 hr to 23.00 hr artificial light, darkness from 23.00 hrs to 24.00 hr, then artificial light from 24.00 hr to 6.00 hr the next day. This was designated as 23L:1D (12 hr day light+11 hr night light making a total of 23 hr Light + 1 hr Darkness). For

intermittent lighting treatment, the photoperiod during night i.e. from 18.00 hr in the evening till 6.00 hr in the morning was given as 2 hr light and 4 hr darkness in two cycles i.e. 2 hrs of light (from 18.00 hr to 20.00 hr) followed by 4 hrs darkness (from 20.00 hr to 24.00 hr), again 2 hr of light (from 24.00 hr to 2.00 hr in the morning) and 4 hr darkness (from 2.00 hr to 6.00 hr). This regimen was designated as 16 L:8D (12hr day light + 4 hr night light- a total 16 L + 8 hr darkness).This intermittent lighting schedule was continued from 14 days up to 42 days of age. The daily feed intake, body weight gain per week, FCR at weekly interval were recorded. The estimated weights of all daily mortality were added to total live weight to correct the feed efficiency losses due to mortality. On 42nd day, five birds from each pen were randomly selected and slaughtered. The carcass, drumstick, fillet and tender yields were recorded. The data was subjected to statistical analysis by employing least square method of Harvey (1975) and means were compared using Duncon's Multiple Regression as corrected by Kramer (1956).

RESULTS AND DISCUSSION

1. Body weight

The data for body weight at different age are presented in Table 1.

Table 1: Effect of different lighting programs on body weight (gram) of commercial broilers (in grams)

Light	Age				
program	14 days	21 days	28 days	35 days	42 days
16L:8D	430.00±14.31[a]	640.22±21.01[a]	955.60 ±21.76[a]	1496.00 ±35.53[a]	1887.21± 42.49[a]
23L:1D	432.00 ±9.86[a]	702.50 ±17.53[b]	1053.50 ±10.17[b]	1542.00± 39.87[a]	1896.30± 34.96[a]

Note: Values bearing common superscripts within columns do not differ significantly (P<0.05).

There was no significant difference (P<0.05) in body weight at 14, 35 and 42 days of age in between the two treatments. However intermittent lighting treatment had significantly lower body weight than continuous lighting treatment at 21 and 28 days of age. This may be due to sudden change in the lighting pattern from continuous to intermittent lighting from 14 days of age onwards. These findings are comparable to the findings of Ingram and Hattens (2000) who stated that light restriction significantly decreased body weight. Buyse *et al*. (1996) observed that final body weights at market age of broilers reared under intermittent schedules are equal to or even higher than those of broilers reared under continuous schedules. Mahmud *et al*. (2011) observed Intermittent lighting system caused a significant increase in the average weight gain as compared to continuous light.

2. Feed conversion efficiency

The data on feed conversion efficiency at different age are presented in Table 2.

The Feed conversion efficiency (FCR) did not differ significantly at 14, 21, and 28 days of age. But it was significantly (P<0.05) better in intermittent lighting regime after 35 days of age. These findings are in close association with that of Ingram and Hattens (2000), Mahmud *et al.* (2011), North and Bell (1990) and Onba *et al*. (2007) who observed that the feed conversion ratio of intermittent light groups was significantly better than continuous light.

The better FCR during the compensatory growth period may be due to efficient use of metabolic energy per unit of metabolic weight, possibly due to lower maintenance energy requirement, lower

Table 2 : Effect of different lighting program on feed efficiency (FCR)of commercial broilers

Light program	Age				
	14 days	21 days	28 days	35 days	42 days
16L:8D	1.45±0.01[a]	1.59±0.03[a]	1.68±0.03[a]	1.72±0.03[a]	1.88±0.02[a]
23L:1D	1.41±0.02[a]	1.59±0.02[a]	1.62±0.04[a]	1.89±0.02[b]	1.99±0.01[b]

Note: Values bearing common superscripts within columns do not differ significantly (P<0.05).

heat production and increased protein gain under intermittent lighting than continuous light regime (Buyse et al. 1996). Better FCR may be attributed to more concave growth curve of intermittent lighting in broilers resulting in reduced cumulative maintenance needs. Since physical activity is very low during darkness and energy expenditure for activity is reduced, use of intermittent lighting program enhanced production efficiency (Rahimi *et al.,* 2005).

3. Caracas yield

The yield of carcass, drumstick, fillets (pectoralis major muscle) and tenders (pectoralis minor muscles) at 42 days of age are presented in Table 3.

Table 3: Effect of different lighting programmes on yields of carcass, drumstick, fillets and tender at 42 days of age.

Light program	Caracas yield (%)	Drumstick yield (%)	Fillets yield (%)	Tenders yield (%)
16L:8D	70.35 [a]	13.51 [a]	11.06 [a]	5.08 [a]
23L:1D	67.80 [b]	12.00 [b]	13.38 [b]	6.82 [b]

Note: Values bearing common superscripts within columns do not differ significantly (P<0.05).

The yield of carcass and drumstick were significantly higher (P<0.05) for intermittent lighting treatment than continuous light treatment. However continuous light treatment produced significantly higher fillets and tenders than in intermittent lighting program. This finding is in accordance with that of Valeria *et al.* (2011) who observed that intermittent lighting program promoted the highest drumstick and thigh yields. However Li, *et al.* (2010) stated that intermittent schedule decreased the breast muscle ratio.

REFERENCES :

Bessei, W., (2006). World Poultry sci. J., 62 (3): 455-466.

Buyse, J., Simons, P.C.M., Boshouwers, F.M.G. and Decuypere, E.(1996). World Poultry sci. J.,52(2):121-130.

Deaton, J. W., Reece, F. N., Mc Naughton, J. L. and Lott, B. D.(1981). Poultry Sci,. 60 (11): 2385-2387.

Harvey, W. R. (1975). Least Square Analysis. USDA-Science and Education Administration-Agricultural Research, New York.

Ingram, D. R. and Hattens, L. F.(2000). J. Applied Poultry Res. Winter,4: 501-504.

Kramer, C.Y. (1956) Biometrics.12 : 307-310

Li, wen-bin., Guo, yan-li, Chen, ji-ian, Wang, rong, He, yao, Su, dong-ge(2010). Asian - Austral. J. Animal. Sci., 11(1) : 7842.

Mahmud, A., Rafiullah,S. and Ali,I.(2011). J. Animal and Plant sci., 21(1): 104-106.

North, M.O. and Bell, D.D.(1990). Commercial Chicken Production Manual. Van Nostrand Reinhold, New York, USA. p.473

Onba E. E., Erol, H., Cantekinand, Z. And Kaya,U. (2007). Asian - Austral. J. Animal. Sci., 20(4): 550 - 555.

Rahimi, G., Rezaei, M., Hafezianand, H. and Saiyahzadeh,H.(2005). Int.J.Poultry sci., 4 (6): 396-398.

Valéria ,M,N,A., Paulo ,G., Arlei,C., Fátima, R., and Dralice ,P.(2011). Res. Bras. Zootec., 40(9):22.

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