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POST-MOULT EGG QUALITY OF COMMERCIAL LAYERS INDUCED TO MOULT UNDER VARIOUS FASTING AND FEEDING REGIMES

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The present work was conducted to determine the effect of various fasting and feeding regimes during moulting on post-moult egg quality characteristics of commercial layers.This experiment was carried out on 180 commercial (Babcock) egg-laying hens available at the age of 122 weeks during the second production cycle after the first moult induction. The birds were kept in single deck type cages comprising 18 experimental units of 10 birds each, that had previously been assigned to six treatment groups having three (5, 10, 15 days) fasting regimes x two (once-a-day and skip a day) feeding regimes in a factorial arrangement with three replications each. During the experimental period each bird was served with 0.80 kg layer mash weekly. A total of 18 randomly selected eggs (one egg per experimental unit) taken every week were used for the study of egg quality i.e. egg weight (g) , shell thickness (mm) , Haugh unit values and yolk index. The fasting and feeding regimes applied during the induced moult did not show any significant effect on post-moult egg weight, shell thicknes, or yolk index. However, the differences in post-moult Haugh unit values in layers induced to moult under various fasting regimes and their interaction with feeding regimes were statistically significant, whereas, feeding regimes did not influence the mean Haugh unit values.

Key words: layers, Haugh unit values, egg weight, shell thickness, yolk index, post-moult.

INTRODUCTION

An induced moult may restore egg shell quality (Roberts and Leary, 1996). Shell thickness and albumen height were reported to be improved significantly during the post-moult period (Lee, 1984) and within the forced moult group the average egg shell thickness was significantly higher in the birds reared on a

restricted diet (Lee, 1984; Akram, 1998). Most of the improvement in egg production by moulting was not caused by an increase in ovulation rate but by a decrease in shell-less eggs (Brake, 1982). Egg shell quality and Haugh unit values or albumen height were also reported to be improved after moulting (Berry and Brake, 1991). Rest periods of 14 days (Bell, 1991), 10 days (Koelkebeck et al., 1992) or 4 to 21 days (Hurwitz et al., 1995) have been shown to improve egg shell quality in laying hens but with variable results. However, according to some workers (Zapata and Grant, 1995) various moulting treatments showed non-significant effects on post-moult egg shell quality.

Therefore, in the present study an attempt was made to determine the effect of various fasting and feeding regimes during a moult on post-moult egg quality of commercial layers.

MATERIALS AND METHODS

The experiment was carried out on 180 commercial (Babcock) egg-laying hens available at the age of 122 weeks during the second production cycle after the first moult induction (Akram et al., 1997). The birds were already kept in single deck type cages in 18 experimental units of 10 birds each. Each unit had previously been assigned to six treatment groups having three (fasting regimes) x two (feeding regimes) in a factorial arrangement with three replications.

Fasting was practised for 5, 10 and 15 days in the hens in groups A, B, C, respectively. Following each fasting regime feed was offered in the following pattern (Akram 1998) :

Fasting groups	Feeding groups
A——————5 days	D (Continuously for 10 days)
	E (On alternate days during 10 days)
B——————10 days	D (Continuously for 10 days)
	E (On alternate days during 10 days)
C——————15 days	D (Continuously for 10 days)
	E (On alternate days during 10 days)

During the experimental period each bird was served with 0.80 kg layer mash weekly. A total of 18 randomly selected eggs (one egg per experimental unit) was taken every week for the study of egg quality i.e. egg weight (g), shell thickness (mm), Haugh unit values and yolk index (Mushtaq-ul-Hassan et al.,

1998). For statistical procedures Steel and Torrie (1980) were consulted. The level of significance used in all the tests was 95%.

RESULTS AND DISCUSSION

The fasting and feeding regimes applied during the induced moult did not show any significant effect on post-moult egg weight (Table 1), but overall egg weight was apparently increased due to moult induction as compared to standard pre-moult egg weight. However, the post-moult flock performance was found to be superior relative to the pre-moult performance in terms of egg weight (Cleaver et al., 1986; Akram, 1998). Non-significant differences were also reported among moulting treatment groups for egg weight (Andrews et al., 1987).

Table 1. Effect of various fasting and feeding regimes on egg weight (g) (Mean ± SD) from commercial layers after an induced moult.

Feeding regimes	Fasting regimes (days)			Mean
	5	10	15	
Continuous	59.763±4.838	59.407±4.339	59.704±2.490	59.624±3.983
Alternate	60.253±4.244	58.406±3.443	59.828±2.753	59.495±3.588
Mean	60.008±4.525	58.906±3.921	59.766±2.607	

The post-moult mean values of shell thickness and yolk index were not influenced by fasting or feeding regimes applied during the induced moult either (Table 2, 3). Induced moult has been reported to improve shell thickness (Lee, 1984) . Most of the improvement in egg production by moulting was not caused by an increase in ovulation rate but by a decrease in shell-less eggs (Roland and Bushong, 1987; Roland and Brake, 1982). A reduction in the incidence of shell defects like pimpling (Roland, 1979) and improvement in egg shell colour (Karunajeewa et al., 1989) were significant features. Improved post-moult egg shell quality and egg production have been correlated with improvement in calcium metabolism either in absorption, transportation or deposition as a result of the induced moult (Roland and Brake, 1982).

Table 2. Effect of various fasting and feeding regimes on egg shell thickness (mm) (Mean ± SD) of commercial layers after an induced moult.

Feeding regimes	Fasting regimes (days)			Mean
	5	10	15	
Continuous	0.323±0.046	0.315±0.046	0.328±0.051	0.322±0.047
Alternate	0.326±0.050	0.334±0.044	0.330±0.045	0.330±0.046
Mean	0.324±0.048	0.325±0.046	0.329±0.048	

Table 3. Effect of various fasting and feeding regimes on egg yolk index (Mean ± SD) of commercial layers after an induced moult.

Feeding regimes	Fasting regimes (days)			Mean
	5	10	15	
Continuous	0.397±0.020	0.398±0.016	0.400±0.022	0.399±0.020
Alternate	0.398±0.020	0.398±0.020	0.397±0.026	0.397±0.022
Mean	0.397±0.020	0.398±0.018	0.398±0.024	

The differences in post-moult Haugh unit values in layers induced to moult under various fasting regimes and their interaction with feeding regimes were found to be significant, whereas, feeding regimes did not influence the mean Haugh unit values (Table 4).

Table 4. Effect of various fasting and feeding regimes on Haugh unit values (Mean ± SD) for commercial layers after an induced moult.

Feeding regimes	Fasting regimes (days)			Mean
	5	10	15	
Continuous	90.731±6.307ab	90.090±6.258a	91.289±7.601ab	91.703±6.768
Alternate	92.661±5.659a	91.587±6.359ab	89.009±7.712b	91.086±6.752
Mean	91.696±6.032ab	92.339±6.313a	90.147±7.693b	

Regarding fasting regimes the maximum (92.339 ± 6.313) Haugh unit value was observed in the 10 day fasting treatment and the minimum (90.147 ± 7.693) in the 15 day fasting group. In connection with the interaction between these treatments the highest Haugh unit value (93.090 ± 6.258) was observed in the 10 days fasting with continuous feeding regime and the minimum in the 15 days fasting with alternate day feeding programme. Overall post-moult albumen height (albumen quality) has been reported to be (Lee,1984, 1987) improved. However, the impact of fasting and feeding regimes on this variable has not been reported so far. In the present study the treatment of moderate fasting for 10 days and its combination with a continuous feeding pattern was observed to be the most effective in obtaining the best albumen quality.

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KVALITET JAJA KOMERCIJALNIH NOSILJA POSLE PRINUDNOG MITARENJA IZAZVANOG USKRAĆIVANJEM HRANE I RAZLIČITIM REŽIMIMA ISHRANE

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SADRŽAJ

U radu su opisani efekti restriktivne ishrane i različitih re'ima ishrane tokom mitarenja na kvalitet jaja komercijalnih nosilja nakon perioda mitarenja. Eksperiment je izveden na 180 komercijalnih nosilja (Babcock) starosti 122 nedelje tokom drugog ciklusa eksploatacije a nakon izazvanog mitarenja. Kokoške su dr'ane u 18 kaveza sa po 10 jedinki i bile su podeljene u šest grupa koje su podvrgavane restriktivnom načinu ishrane i različitim reimima (5, 10 i 15 dana). Drugih šest grupa je hranjeno jednom dnevno a preostalih šest grupa svakog drugog dana.Tokom eksperimenta svaka kokoška je dobijala po 0.8 kg smeše za nosilje nedeljno. Jaja su prikupljana metodom slučajnog izbora i određivana je njihova te'ina, debljina ljuske, broj Hugovih jedinica i indeks umanceta. Dijetarni re'im ishrane nije pokazao značajan uticaj na ispitivane parametre. Restriktivna ishrana je imala značajan uticaj samo na broj Hugovih jedinica.