

Application of short fasting methods to induce molting in commercial laying hens

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One experiment was conducted to evaluate if induced molting methods using short fasting intervals can be satisfactory replaced for continuous feed removal. One hundred and eighty Hy-line W36 layers were randomly allocated to four treatments according to equal body weight in a completely randomized design. Treatments were: 1) continuous feed removal until 30% body weight reduction, then feeding ad libitum on a commercial layer diet as a control, 2) fasting for 3d followed by feeding at libitum a diluted commercial layer diet with ground, delinted, whole cotton seed (65% layer diet : 35% whole cotton seed), 3) fasting for 3d, then fed freely a 91% corn middling diet plus 9% vitamin and mineral supplements for 25d, and 4) fasting for 3d, then fed freely a 91% wheat middling diet plus 9% vitamin mineral supplement for 25d. The experiment was lasted 5 months consisting of 1mo molt period and 4mo postmolt period. The results indicated that T1, T2, T3, and T4 were respectively lost 32.5, 24.5, 5.05 and 9.1% of their initial body weight after 14 days of induction of molt and these differences were significant ($P<0.05$). At Day 20 in molt, ovary and oviduct weight regression were considerably lower in short fasting methods compared to continuous fasting. There were no significant differences with respect to postmolt egg production feed conversion ratio, egg shell strength and egg shell thickness.

Keywords: molting; layer; ovary; oviduct; egg quality

Introduction

Induced molting of laying hens is a common practice in many countries. Typical molting program is usually induced by depriving hens of feed for 10 or more days or to reach 30% body weight loss (Ruszler, 1998). However, this procedure significantly depresses the cell-mediated immune response in the hens (Holt, 1992) and it may prone the hens to salmonellosis (Holt, 2003). Holt (2003) reported that molted hens were 100- to 1000-fold more susceptible to infection by *Salmonella enteridis* and more readily transmitted the organism to uninfected hens in neighboring cages. Reduction in period of fasting can reduce the risk of microbial infectious. The purpose of the present study was to evaluate the effects of short fasting molting alternatives on body and organ weight changes and post-molt performance of laying hens.

Material and methods

One hundred and eighty Hy-line W36 laying hens (78wk of age) were housed in a cage layer house exposed to 17 h daily photoperiod before the onset the experiment. All hens were weighted

and allocated to four treatment groups according to equal body weight. Three replicates of 15 hens each (3 adjacent cages, 40 × 45cm, containing 5 hens per cage) were randomly assigned to each treatment. Treatments (molting procedures) were: 1) continuous feed removal until 30% body weight reduction, then feeding ad libitum on a commercial layer diet as a control, 2) fasting for 3d followed by feeding at libitum a diluted commercial layer diet with ground, delinted, whole cotton seed (65% layer diet : 35% whole cotton seed), 3) fasting for 3d, then fed freely a 91% corn middling diet plus 9% vitamin and mineral supplements for 25d, and 4) fasting for 3d, then fed freely a 91% wheat middling diet plus 9% vitamin mineral supplement for 25d.

The daily photoperiod was decreased to 10h on Day 1 and was increased to 11.5 and 13h on Day 23 and Day30 respectively, then increased 15min per week for the next four weeks. From then on up to the next six weeks, the photoperiod was increased 30min per week until a photoperiod of 17h was reached at peak production.

Body weight of hens was measured on Day1 and 14. In order to determine the ovary and oviduct regression, three hens from each group was euthanized on Day 1 and 20. Ovary and oviduct weights were recorded and presented as a percentage of body weight.

Data were analyzed in a completely randomized design.

Results and discussion

Table 1 depicts the summary of performance traits and ovary and oviduct regressions. Body weight loss at Day 14 was 32.5, 24.5, 5.05, and 9.1% for hens subjected to continuous fasting and those fed whole cotton seed, corn middling and wheat middling respectively. Hens fed whole cotton seed significantly lost less weight compared to those subjected to continuous fasting ($P<0.05$). In the other hand, hens fed whole cotton seed significantly lost more weight in comparison with those fed corn or wheat middling ($P<0.05$). Davis et al. (2002) reported that hens fed whole cotton seed had a body weight loss rate equivalent to hens subjected to continuous feed removal. The difference between the present findings with those reported by Davis et al. (2002) with respect to body weight loss may be related to the inclusion rate of cotton seed in the diet. The proportion of cotton seed in the diet in the present experiment was 35% which is quite less than 50% used by Davis et al. (2002).

As it was expected, regression in ovary and oviduct weights was greatest in hens continuously deprived of feed and their differences were significant with other treatments ($P<0.05$). Berry (2003) suggests that involution of ovary and oviduct spares other body energy and protein reserves and this will survive the birds in a prolonged fasting.

Birds subjected to continuous fasting had highest postmolt egg production at peak whereas they had lowest egg production in a 4mo postmolt period. Nevertheless, these differences were not significant. These findings are consistent with those reported by Ruszler (1998) who indicated that peak production was higher in hens on long fasting than hens on short fasting. Hens fed whole cotton seed had the best feed conversion ratio compared to other groups but the difference was insignificant.

There were no significant differences among the treatments with respect to egg shell strength and thickness.

In conclusion, short fasting for 3d followed by feeding whole cotton seed, corn and wheat middlings can be satisfactorily replaced for continuous feed removal. In this regard, feeding a layer diet diluted at 35% with ground, delinted, and whole cotton seed made best results due to highly regressions in ovary and oviduct weights.

Table 1 The effects of induced-molting methods on body weight and reproductive organ regressions and postmolt performance and egg quality in laying hens

Criteria	Treatments				LSD
	Continuous fasting	whole cotton seed	corn middlings	wheat middlings	
Body weight loss (%)	32.5 ^a	24.5 ^b	5.05 ^c	9.1 ^c	5.97
Ovary weight loss (%)	74.2 ^a	59.4 ^b	55.7 ^b	49.4 ^b	10.5
Oviduct weight loss (%)	68.0 ^a	36 ^{bc}	27.8 ^c	49.6 ^b	13.3
Peak egg production (%)	78.1	76.2	77.7	72.1	9.4
Postmolt egg production(%)	66.7	69.5	67.6	61.9	10.0
FCR at peak	1.86	1.80	1.86	1.95	0.02
Total postmolt FCR	2.44	2.38	2.54	2.56	0.35
Egg shell strength(kg/cm ²)	3.93	3.56	4.07	4.13	0.66
Egg shell thickness (mm)	0.39 ^a	0.35 ^b	0.40 ^a	0.39 ^a	0.03

In each row, means with different letters have significant difference (P<0.05).

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