

HAEMATOLOGICAL VALUES AND PLASMA CHOLESTEROL AS AFFECTED BY MOULTING IN NICK CHICK LAYING HENS

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ABSTRACT

This study was conducted to examine effect of moulting on haematological values and plasma cholesterol levels of 86 weeks old Nick Chick laying hens. Washington and California moulting methods were used. Young laying hens, 40 weeks old served as control group. There were 408 hens in each group. There was no significant ($P < 0.05$) difference in haematological mean values of WBC's RBCs haemoglobin, packed cell volume (PCV), Mean corpuscular haemoglobin concentration (MCHC), Mean corpuscular volume (MCV) and plasma cholesterol. There was significant difference in platelets count, being low in California method. This study provided evidence that moulting played an important role in restoring normal physiological processes in old spent hens.

Keywords: Haematological values, plasma cholesterol, moulting, Nick Chick hens

INTRODUCTION

It is observed that laying hens follow a consistent pattern in egg production. There is peak production around 30-40 weeks of age and then there is decline in production till birds are out of production. The old spent hens are now being subjected to moulting in view of economics of egg production. Different methods of moulting are recommended (North, 1978) but their relative efficacy is important. Subsequent to moulting the old hens get rejuvenated and assume egg production nearly comparable with adult stocks. Resumption of normal egg production following moulting process linked to egg production. Erythrocytes count is affected by thyroid hormone where oestrogen has no influence. Higher erythrocyte (RBC) volumes are noted in winter. Plasma haemoglobin level is modified in sex and also when there is deficiency of iron and copper. Leucocyte count is changed with age and health status (Sturkie, 1965). In every laying hen alteration in Mean corpuscular haemoglobin concentration (MCHC) also takes place. The lowest MCHC values are found at the end of laying and the highest around the return to laying (Sturkie, 1965). The corpuscular volume (haematocrit) is noted to be linked to sex of chickens. The plasma cholesterol is decreased when hens are given probiotics in diet (Mohan *et al.*, 1995), and is also invariably related to dietary copper in excess of requirements (Bakalli *et al.*, 1995), but is increased by casein diet (Choi and Chee, 1995) or when there is highest protein level (Rukmangodhan *et al.*, 1992). A positive correlation was noted between serum calcium and serum cholesterol (Sloan, 1994).

This study was undertaken to examine any modification in haematological values and plasma cholesterol caused by the moulting process in old Nick Chick laying hens.

MATERIALS AND METHODS

In order to study relative effectiveness of Washington and California methods of moulting, 86 weeks old stock of Nick Chick layers was involved. The experimental birds were maintained in open poultry sheds in Breeding Division of Poultry Research Institute, Rawalpindi. Nick Chick laying 408 hens were provided under each method of moulting. Another flock of Nick Chick hens aged 40 weeks was maintained as control group for the purpose of comparison. The control group was in peak laying condition. The birds were fed commercial layer ration prior to subjecting them to moulting. The ration contained 14.87 per cent crude protein, 3.0 per cent calcium, 0.37 per cent phosphorus and 9.9 per cent moisture. The ration contained 19 parts per billion (ppb) of aflatoxin (B_1) contents. Water was provided *ad libitum* and feed was provided at rate of 112 g per bird per diem. Two methods of moulting such as Washington and California methods were used to test their relative efficacy on production performance of old laying Nick Chick stock as per recommendations of North (1978). In Washington method, birds were provided feed and water *ad libitum* for one day with 8 hours light. During days 2-3, feed and water were withdrawn. On 4th day, water was provided but no feed was given. On 5 to 49

days, birds were offered feed 27 g each till egg production was reached upto 1 per cent. Water was provided *ad libitum*. Full feed at rate of 112 g each bird was offered from day 50 onward. Birds received eight hours of light till 49 days which was increased to 16 hours on 50th day onwards. In California method birds received only water for day 1 to 10 with eight hours of light. Full feed at rate of 112 g grain each bird was offered to birds from day 11 to 30 with water *ad libitum* and 8 hours of light. Layer mash at rate of 112 g each bird was offered to birds from day 31 to 68. Water was available *ad libitum* and light was increased to 16 hours.

Birds were protected against various infectious diseases through prophylactic vaccination. Haematological values (Benjamin, 1978) and plasma cholesterol (by means of enzymes colorimetric kiit method) were estimated. Measurement of plasma cholesterol was included as liver function test (LFT). Five blood samples were taken at random from each group for estimations. The data were subjected to analysis of variance (Steel and Torried, 1981) to draw inferences regarding effect of moulting on blood parameters.

RESULTS AND DISCUSSION

The findings regarding haematological values and plasma cholesterol levels as assessed in all the three groups are given in Table 1. It was noted that there was non-significant difference among haematological values except platelets (PLT) which were lower ($P < 0.01$) in hens treated with California method which is curious. Difference between Washington method and control group was non-significant. The mean values of white blood cells were in agreement with those of Sturkie (1965). The mean values of erythrocytes agreed with earlier reports (Sturkie, 1965). The haematocrit mean values as round in Control, WM and CM groups, respectively were in agreement with those documented earlier (Sturkie, 1965). Similarly packed cell volume, mean values were identical in Control, WM and CM groups, respectively. The mean corpuscular haemoglobin concentration in Control, WM and CM groups, respectively agreed with Sturkie (1965). Plasma cholesterol mean values estimated in Control, WM and CM groups, respectively were consistent with that of earlier report (Mohan *et al.*, 1995). Non-significant difference in all haematological and plasma cholesterol mean values suggested that normal productive performance in moulted hens is presumably due to the reason that moulting technique brings about restoration of old age related physiological processes particularly haematopoietic system and liver function to a level comparable with young laying stocks. This study provides explanation to the rejuvenation caused in

spend hens by moulting. The technique of moulting is gaining popularity in view of its economic importance particularly in breeding stocks. The understanding of underlying physiological mechanism further reinforces the adaptation of moulting practice in spent laying stocks.

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Table 1: Haematological mean values and plasma cholesterol in moulted Nick Chick laying hens.

Blood parameter	Normal hens (control)	Moulted hens	
		Washington methods	California method
WBC ($\times 10^9/L$)	19.8 \pm 0.81	19.5 \pm 3.91	19.7 \pm 2.63
RBC ($\times 10^{12}/L$)	2.68 \pm 0.09	2.51 \pm 0.20	2.77 \pm 0.11
Hb (g/dl)	8.0 \pm 0.49	8.1 \pm 0.90	7.9 \pm 0.8
HCT (%)	32.43 \pm 1.36	31.34 \pm 2.55	32.20 \pm 1.45
MCV (fl)	120.87 \pm 1.30	124.56 \pm 2.57	122.12 \pm 5.67
MCH (pg)	29.80 \pm 1.06	32.18 \pm 1.91	29.60 \pm 1.42
MCHC (g/dl)	24.670.64	25.80 \pm 1.26	24.70 \pm 0.61
PLT/ml	7666.6 \pm 3483.6	7400.0 \pm 1673.32	2400.0 \pm 894.43
PCV(%)	9.07 \pm 0.88	8.86 \pm 0.97	9.18 \pm 1.28
RDW-CV(%)	29.77 \pm 2.04	32.38 \pm 2.04	32.24 \pm 1.94
Plasma Cholesterol (mg/dl)	131.3 \pm 1.44	157.20 \pm 29.54	142.56 \pm 14.02

Values with different superscripts in a row are significantly different ($P < 0.05$).

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