

## BLOOD PICTURE OF BROILER CHICKS AS INFLUENCED BY FEED RESTRICTION DURING BROODING

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The effect of feed restriction during brooding period (first 10 days) on the blood picture of broiler chicks was determined during a 42 days study at the Poultry Research Center, University of Agriculture, Faisalabad. There was non-significant effect of feed restriction on haemoglobin concentration, erythrocyte sedimentation rate and packed cell volume. However, significantly higher cholesterol level was observed in the birds restricted by 70% feeding rate and 12 hours feeding. The feed restriction had no significant effect on blood glucose and serum protein levels in the broiler chicks.

### INTRODUCTION

Blood composition reflects the state of health of birds and any change in the body metabolism would ultimately result in variation in the blood constituents. Some of the blood parameters are reported to be affected by the restricted feeding in broilers. The normal level of blood glucose is  $196 \pm 4$  mg/100 ml and serum protein 4.63 g/100 ml (Sturkie, 1976), whereas the total cholesterol level is reported as 150 mg/100 ml in chicks.

Under restricted feeding conditions, chicks may exhibit growth retardation and disturbances in the metabolic process. Blood parameters like serum cholesterol, serum protein and glucose might be influenced adversely in broiler chicks raised under such stressful conditions particularly if imposed during brooding. A project was thus planned to see the effect of feed restriction during brooding on certain blood parameters during early brood-

ing period (0-10 days) and at the end of 42 days in broiler chicks.

### MATERIALS AND METHODS

One hundred and fifty, day-old Hubbard broiler chicks were wingbanded, weighed individually and were randomly divided into 15 groups of ten chicks each. Three groups / replicates were randomly allotted to five treatments (A, B, C, D, and E). The chicks were brooded at 35°C on deep litter system during first week and thereafter the temperature was reduced every week by 3°C upto the end of 3rd week. After that chicks were kept at room temperature. Twenty-four hour light was adopted for all the groups. The feed restriction was imposed from 2 hours post arrival of the chicks till the end of 10th day. All the broiler chicks were placed on regular broiler starter ration for 3 weeks and broiler finisher ration for further 2

weeks. The feeding plan was as under:

Feeding plan	Description
A (Control)	Fed <i>ad libitum</i>
B	The same feed given at the rate of 70% of the <i>ad libitum</i>
C	The same feed provided at 12 hours intervals by removing the feeders
D	<i>Ad libitum</i> feeding of a low protein and normal energy containing ration
E	<i>Ad libitum</i> feeding of a low energy and normal protein containing ration

The chicks were fed commercial broiler feed prepared by M/S Supreme Feeds, Faisalabad. The blood samples were collected from randomly picked 3 chicks of each group at 10th day of brooding by heart puncture and the serum was separated after half an hour. The blood samples were again collected from the same birds at the end of the experiment (42 days) from wing veins. Following blood parameters were determined according to the methods described by Benjamin (1978).

- (i) Haemoglobin concentration g/DI(Hb)
- (ii) Erythrocyte sedimentation rate mm/hr(ESR)
- (iii) Packed cell volume(% concentration) (PVC)

Sahli's haemoglobinometer was used for measuring the haemoglobin concentration in blood samples. The packed cell volume was estimated by capillary method using microhaematocrit tubes, cen-

trifuging at 3000 rpm for 15 minutes and values were read from the haematocrit chart. The observations for erythrocyte sedimentation rate were taken after keeping Westergen tubes filled with blood in vertical position for one hour. The serum cholesterol, serum protein and glucose levels were determined using kits by measuring absorbance in the spectrophotometer. The data thus collected were analysed statistically for significance according to the methods described by Steel and Torrie (1981). The multiple comparison of means was made according to the Duncan's Multiple Range Test.

## RESULTS AND DISCUSSION

**Haemoglobin (Hb):** The average haemoglobin concentration in broilers at 42 days of age in groups A, B, C, D and E was found to be 7.52, 7.66, 6.66, 6.66 and 6.86 g/100 ml of blood, respectively (Table 1). Statistical analysis of the data revealed non-significant effect of different feed restrictions on Hb concentration. These results are in line with those of Shah(1989) who reported non-significant effect of rearing stage feeding regimes on the average blood Hb content of White Plymouth Rock chickens.

**Erythrocyte Sedimentation Rate (ESR):** The average erythrocyte sedimentation rate of broiler was 1.00, 0.33, 0.66, 1.33 and 1.33 mm/hour in groups A, B, C, D and E, respectively. The results of statistical analysis indicated a non-significant influence due to feed restriction on ESR in broiler chicks. The present results are in agreement with earlier findings of Shah(1989) who also reported non-significant effect of feed

restriction on ESR values.

**Packed Cell Volume (PCV):** The mean packed cell volume (PCV) in chicks was observed to be 21.33, 21.66, 14.00, 19.66 and 15.33% in groups A, B, C, D and E, respectively. The results of the analyses of

variance revealed a non-significant effect due to different feed restriction regimes on PVC. These results are also in close proximity with the findings of Shah(1989) who observed non-significant effect on PVC in Plymouth Rock chickens.

**Table 1. Average values of various blood parameters of chicks at 42 days of age**

Description	Groups				
	A	B	C	D	E
Haemoglobin (g / 100 ml of blood)	7.52	7.66	6.66	6.66	6.86
Erythrocyte sedimentation rate (mm / hour)	1.00	0.33	0.66	1.33	1.33
Packed cell volume (%)	21.33	21.66	14.00	19.66	15.33

**Serum Glucose:** The average serum glucose levels in broiler chicks at the age of 10 and 42 days in groups A, B, C, D and E are given in Table 2. When the recorded data were subjected to statistical analyses, the results indicated that the treatment period and their interaction did not influence the blood serum glucose level. The results are substantiated by the findings of Zaman *et al.* (1985) who reported that the restricted feeding period had non-significant influence on blood glucose.

**Serum Protein:** The mean serum protein level in the blood of broilers at 10 and 42 days age in all experimental groups is given in Table 2. It is apparent from this table that the serum protein level was low

at 10 days than at 42 days age in all groups. The results showed significant effect due to treatment and treatment-period interactions. The present results are supported by the earlier findings of Shim *et al.* (1979) who found higher serum protein at 12th than at 6th week of age in chicks.

**Serum Cholesterol:** The average serum cholesterol level in the birds at 10 and 42 days of age in groups A, B, C, D, and E was 144.59, 219.10, 193.90, 141.46 and 126.07 mg/100 ml of blood, respectively (Table 2). The results indicated significant ( $P < 0.01$ ) effect of feed restriction, its periods and their interaction. The multiple comparison of means by Duncan's Multiple Range Test showed significantly higher cholest-

**Table 2. Average values of serum glucose, serum protein and serum cholesterol at 10th and 42 days**

Description	Groups				
	A	B	C	D	E
Average glucose (mg/100 ml)					
At 10th day	185.15	192.55	192.54	190.69	186.98
At 42nd days	190.99	191.55	191.55	189.99	190.88
Cumulative	188.07	192.05	192.04	190.34	188.93
Average serum protein (g/100 ml)					
At 10th day	3.26	3.61	3.44	2.39	3.68
At 42 days	5.60	5.35	5.98	5.04	5.18
Cumulative	4.43	4.48	4.71	3.71	4.43
Average serum cholesterol (mg / 100 ml)					
At 10th day	149.08	295.18	245.19	140.54	109.48
At 42 days	140.10	143.01	142.59	142.38	142.64
Cumulative	144.59 <sup>c</sup>	219.10 <sup>a</sup>	193.90 <sup>b</sup>	141.46 <sup>c</sup>	126.07 <sup>d</sup>

The same superscript for means in a row shows non-significant difference.

terol level in group B and C than all other groups. However, a non-significant difference was found in birds kept in groups A and D, whereas significant decrease of cholesterol level was observed in birds of group E. The results also indicated significantly higher cholesterol level at 10 days as compared to 42 days of age. These results are in agreement with those of Zaman *et al.* (1985) who reported that feed restriction increased cholesterol level in

blood. Mol *et al.* (1982) reported that cholesterol in serum was not changed due to low/high protein in the diet. The probable reason may be the fasting which causes mobilization of fat through gluconeogenesis and ultimately increases the cholesterol level in the blood.

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