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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan  
Mob: +92 300 3008585, Fax: +92 41 8815544  
E-mail: editorijps@gmail.com

## Effect of Caponization on Body Weight, Hematological Traits and Blood Cholesterol Concentration of Nara Chicken

M.M. Rahman<sup>1</sup>, M.A. Islam<sup>2</sup>, M.Y. Ali<sup>1</sup>, M.E.A. Khondaker<sup>3</sup> and M.M. Hossain<sup>4</sup>

<sup>1</sup>Proshika, Section-2, Mirpur, Dhaka-1216, Bangladesh

<sup>2</sup>Department of General Animal Science and Animal Nutrition,  
Dinajpur Government Veterinary College, Dinajpur, Bangladesh

<sup>3</sup>Department of Basic and Social Sciences,  
Dinajpur Government Veterinary College, Dinajpur, Bangladesh

<sup>4</sup>Animal Health and Nutrition Division, Eskayef Bangladesh Ltd.,  
Gulshan, Dhaka, Bangladesh

**Abstract:** A total of 21 four weeks old Nara males divided into 3 groups as A-non-caponized, B-chemically and C-surgically caponized birds having 7 males each. The birds were caponized at 4 weeks of age and reared on individual cages up to 16 weeks of age to assess the body weight gain, hematological traits and blood cholesterol concentration. The weight gain was significantly increased in caponized birds compared to non-caponized birds ( $p < 0.01$ ). However, surgically caponized birds gained the highest body weight. Total erythrocyte count, packed cell volume and hemoglobin concentration were significantly reduced in caponized birds compared to non-caponized birds ( $p < 0.01$ ). Testis weight of group A and B at 16 weeks of age were 19.20 and 2.58 g/bird respectively. The highest enlargement of liver and spleen was found in group-C followed by group-A and B. Adrenal gland weight of A, B and C were 0.14, 0.21 and 0.26g/bird respectively ( $p < 0.01$ ). Reduced comb, wattle and head of caponized birds were observed compared to the non-caponized birds. Caponization is the most suitable technique to have maximum meat from chicken. However, surgically caponization may be the best technique for maximum growth.

**Key words:** Chicken, caponization, body weight, hematological traits, cholesterol

### Introduction

About 37% of total animal protein is supplied by poultry in Bangladesh (Rahman and Rahman, 1998). Poultry scientists are trying to increase poultry production involving new technology in respect of breeding, feeding, housing, management, prevention and control of disease. We are in far away from the requirement of animal protein (Huque, 1993). So we need to increase poultry production rapidly because, poultry is only the easiest, cheapest and shortest possible way to reach in the goal. Besides poultry meat is good source of animal protein suited to human food in all stages of their life. Moreover, capon meat is the best of poultry meat considering its food value, flavour and taste, because meat contain higher amount of linolenic acid along with other poly unsaturated fatty acid which are good for health compared to the non capon meat (Synder *et al.*, 1962). Capon meat contains higher amount of protein, vitamins, essential mineral and fat. In addition indigenous as well as layer type cock is gained body weight slowly and very poor so that carcass weight at 16 weeks is very poor (Huque, 1993). In which capon became bigger in size within the similar age as non-capon gained weight (Akter *et al.*, 1996). Caponization technology is not practiced commercially in Bangladesh. Sometimes it is used by some farmers

traditionally. Therefore, it is important to investigate whether this technology is applicable commercially for favour of greater improvement of poultry meat production. Under these circumstances, the present study was aimed to assess the effect of caponization on growth, hematological traits and blood cholesterol concentration of Nara chicken.

### Materials and Methods

The experiment was conducted at the Department of Physiology and Surgery and obstetrics, Bangladesh Agricultural University, Mymensingh, Bangladesh for a period of 4 months in winter. A total of 21 three weeks old Nara chicken were divided into 3 groups; A-control, B-hormonal (chemical) capon and surgical capon having 7 birds each.

**Caponization of birds:** Caponization was performed in different methods like 1) surgical 2) chemical method (Hormonal method).

**Surgical method:** On 27<sup>th</sup> day, 7 chicks of C-group were deprived of feed and water for 12 hours before caponization to avoid excessive bleeding during surgery and to make the testicle visible and easier to remove (Card and Nesheim, 1973). Testicles were removed

through the last two ribs by using caponizing forceps. Nebanol skin ointment was used just after operation.

**Chemical method:** On 28<sup>th</sup> day, 7 birds of group-B were injected with 10 mg Devoprovera (R) subcutaneously on the neck region. After initial dose, further dose of 5 mg/bird was given at 5 weeks, 6 weeks and 7 weeks of age.

After caponization, all the birds including control birds were reared on individual cages providing space of 1396 cm<sup>2</sup>/bird. The birds were fed *ad libitum* diet containing 21% CP and 2900 kcal ME/kg. The following parameters were recorded during the experimental period:

**Body weight:** Bi-weekly individual bird up to the end of experiment.

**Hematological traits:** At 16 weeks of age, blood from each bird was collected by sterile syringe with needle and transferred to sterile tube containing anticoagulants (4% sodium citrate solution) at the ratio of 1:10. It was used for different hematological traits within two hours after collection and determined total erythrocyte count (TEC), ESR, PVC and Hemoglobin.

**Blood cholesterol:** At 16 weeks of age, blood from each bird was collected directly from the wing vein by needle puncture and cholesterol concentration was determined by "Rflotrom meter" an auto analyzer.

**Gross pathological changes:** Testis, liver, spleen and adrenal gland were removed after slaughtering and weighed.

**Morphological and behavioral changes:** Changes of comb, wattle, hackle feather, saddle feather and head were also observed.

**Statistical analysis:** Data were analyzed using computer MSTAT package program.

## Results and Discussion

**Growth performance:** Significantly different body weight gain of bird was observed between groups at all ages ( $p < 0.01$ ) (Table 1). Surgically caponized birds gained the highest body weight, intermediate on chemically caponized birds and the lowest on control group birds at all ages.

The present study showed that the caponization of bird was as effective technique to improve the body weight. However, surgical method was the most suitable technique to improve body weight gain of chicken rapidly, consistent with the findings of Akter *et al.* (1996) and Welter (1976). Lorenz (1954) found that synthetic hormone depressed the secondary sexual characteristics of cockerels while it increased the rate of live weight gain.

**Morphological changes:** As morphological appearance, comb and wattle were bigger in control group-A, medium

in group-B and the lowest in group-C. As observation of behavioral changes, caponized birds were quiet, docile and sluggish compared to the control birds. Hackle and saddle feather growth of caponized birds were reduced from that of the control-A birds, observed during investigation.

Poley (1940) reported that the secondary sex characters like comb, wattle, hackle and saddle feather were depressed due to the deficiency of testosterone in capons, which was supported the present investigation.

**Hematological traits:** Both of chemically and surgically caponized birds were significantly different from that of control birds in respect of total erythrocyte counts, packed cell volume and hemoglobin concentration in blood (Table 2). But there was no erythrocyte sedimentation rate on chemically and surgically caponized birds.

**Blood cholesterol concentration:** The highest blood cholesterol was observed on surgically caponized group, intermediate on control and the lowest on chemically caponized group ( $p < 0.01$ ) (Table 2).

The total erythrocyte count (TEC) was lower in caponized birds than that of non-caponized birds and TEC was the lowest in chemically caponized birds. None of erythrocytes sedimentation rate was found in caponized birds but was found on non-caponized birds ( $p > 0.05$ ) supported by Kundu *et al.* (1993). The present findings showed the lower PCV in caponized birds compared to the non-caponized Nara birds. This was partially supported by Sturkie and Textor (1960). They found the PCV of 48, 31 and 38% in sexually matured WLH male, female and capons respectively. Hemoglobin concentration was lower in caponized bird than that of non-caponized birds, corresponded with Miller *et al.* (1985). Akter *et al.* (1996) found the highest blood cholesterol concentration in surgically caponized birds in comparison with non-caponized and chemically capons which was similar with the present findings.

## Organ changes

**Changes of testis, liver, spleen and adrenal gland of caponized birds:** The weight of testis in control and chemically caponized birds were 19.20 and 2.58g/bird respectively ( $p < 0.01$ ). The significant differences were found for liver, spleen and adrenal gland weight among different groups ( $p < 0.01$ ). Surgically caponized birds had the highest liver, spleen and adrenal gland weight, intermediate on control group and the lowest on chemically caponized birds (Table 3).

Sizes of the testicles were significantly reduced in chemically caponized birds in comparison with the control birds, reported by Chand and Pandey (1975). Liver and spleen weight were affected significantly by chemical or surgical caponization.

Adrenal gland weight of capons was increased than in control birds. In removal of testis, due to hyper activity of

Table 1: Effect of caponization on body weight (kg/bird) at different ages of Nara Chicken

Age in week	Control-A	Chemical-B	Surgical-C	Mean±Sd	Level of significance
4	0.65	0.65	0.66	0.65±0.06	**
6	0.81	0.86	1.10	0.92±0.15	**
8	1.03	1.10	1.90	1.34±0.42	**
10	1.18	1.34	2.12	1.55±0.44	**
12	1.30	1.47	2.42	1.72±0.52	**
14	1.63	1.84	2.52	2.00±0.40	**
16	1.74	1.97	2.74	2.15±0.45	****

, p<0.01

Table 2: Effect of caponization on hematological traits and blood cholesterol Concentration of Nara birds at 16 weeks of age

Traits	Control-A (Mean±SD)	Chemical-B (Mean±SD)	Surgical-C (Mean±SD)	Level of significance
Hematological traits				
Total erythrocyte count (TEC) millions/mm <sup>3</sup>	2.4±0.22	1.9±0.15	2.0±0.14	**
Erythrocyte sedimentation rate (mm in first hour)	0.1±0.19	0.0±0.08	0.0±0.08	NS
Packed cell volume (PCV)	26.5±0.98	24.8±0.67	25.1±0.69	**
Hemoglobin concentration	9.2±0.53	7.97±0.31	8.0±0.24	**
Blood cholesterol concentration (mg/dl)	113.0±2.16	108.1±1.35	120.8±3.98	**

NS, p>0.05; \*\*, p<0.01

Table 3: Effect of caponization on testis, liver, spleen and adrenal gland of Nara birds at 16 weeks of age

Parameters	Control-A (Mean±SD)	Chemical-B (Mean±SD)	Surgical-C (Mean±SD)	Level of significance
Testis (g/bird)	19.20±1.30	2.85±0.79	-	***
Liver (g/bird)	40.53±0.91	32.43±0.94	42.67±0.42	**
Spleen (g/bird)	3.05±0.04	2.54±0.15	4.19±0.18	**
Adrenal gland (g/bird)	0.14±0.00	0.21±0.01	0.26±0.00	**

\*\* , p<0.01; \*\*\*, p<0.001

the adrenal gland, enlarged the size of the gland compared to the control group agreed with Jones (1956).

**Conclusion:** This study reveals that caponized birds will be heavier than the non-caponized birds. After removal of testis, birds are gained body weight rapidly. So, this technique may be used by the farmers under rural condition to have maximum meat as well as benefit.

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