

CARCASS CHARACTERISTICS IN BROILERS AS INFLUENCED BY ASCORBIC ACID SUPPLEMENTATION THROUGH DRINKING WATER

Abdul Shakoor, M. Fahim Ullah, Nazir Ahmad, Ahsan-ul-Haq & Abid Ali Tipu

*Department of Poultry Husbandry,
University of Agriculture, Faisalabad*

The effect of ascorbic acid supplementation through drinking water was observed on 120 Hubbard broilers during seven weeks of experimental period. The chicks of groups A, B, C and D were supplemented with ascorbic acid at the rate of 0, 1000, 1200 and 1400 ppm, respectively. All the groups were fed commercial broiler ration *ad libitum* throughout the period. Broilers showed significantly better dressing percentage, edible meat percentage, bone meat ratio, shank and keel lengths and tibia ash while non-significant effects were observed on liver, heart and gizzard weights.

INTRODUCTION

Heat stress is one of the major factors adversely affecting overall poultry production in countries like Pakistan. The domestic fowl is a homeotherm which can live comfortably only in a relatively narrow zone of thermoneutrality, extending from 14.5-25.5°C (Freeman, 1969). Any deviation especially on higher side depresses both the survival rate and production. It is generally agreed that heat stress not only depresses growth rate but also increases death losses in birds.

Pardue *et al.* (1985) reported that added ascorbic acid reduced plasma corticosteroids following acute heat stress in broilers, thus limiting some of the deleterious responses associated with stress and delaying the depletion of steroid hormone precursors. Deleterious effects of high adrenal steroids include reduced plasma potassium and increased plasma sodium, indicative of dehydration. Ascorbic acid addition prior to heat stress resulted in near normal plasma potassium. Increased protein

catabolism associated with acute stress, as indicated by increased plasma protein, was ameliorated by ascorbic acid addition to the diet prior to stress. Ascorbic acid administration through drinking water is more flexible than that given in feed. Also, if ascorbic acid is useful in maintaining electrolyte balance, it could result in increased carcass yield and improve the organoleptic properties of meat for poultry throughout the period of stress. This study was conducted to observe the effect of ascorbic acid supplementation in combating heat stress during summer in broiler production under local environmental conditions.

MATERIALS AND METHODS

One hundred and twenty day-old Hubbard broiler chicks of mixed sexes were weighed individually, wing-banded and then randomly divided into 12 experimental units of 10 chicks each. All the replicates were reared in separate pens of 120 x 90 cm size covered with wire gauze frames. The chicks were brooded at 35°C during first week and

temperature was lowered by 3°C each week till it reached 25°C which was maintained for the remaining period of the experiment. The chicks were vaccinated against Newcastle disease at day-old through intraocular route and intramuscular route at four weeks of age. The experimental chicks were offered commercial broiler ration *ad libitum*. Supplementation of ascorbic acid was done through drinking water at the rate of 0 ppm, 1000 ppm (1 g/l), 1200 ppm (1.2 g/l) and 1400 ppm (1.4 g/l) of water, adjusted to the concentration of vitamin C in the commercial preparation and offered to the three experimental units of 10 chicks each, respectively, till seven weeks of age. At the end of the experiment, one bird from each replicate was picked randomly, slaughtered and dressed through hot water scalding to determine the following carcass characteristics:

1. Dressing percentage
2. Edible meat percentage
3. Bone meat ratio
4. Shank and keel length
5. Tibia ash
6. Giblet weight

The data were analysed statistically by using analysis of variance technique and comparisons of mean differences were made by applying Duncan's Multiple Range test (Steel and Torrie, 1981).

RESULTS AND DISCUSSION

Carcass characteristics: The average dressing percentage of broiler chicks in groups A, B, C and D was 68.70, 70.71, 71.50 and 73.48%, respectively at the end of the experiment (Table 1). The average edible meat percentage was 58.70, 62.54, 63.66 and 66.65 in groups A, B, C and D, respectively. The average bone meat ratio with treatments A, B, C and D was 2.82, 4.07, 4.30 and

4.56, respectively (Table 1). The average shank length was 7.62, 8.65, 9.03 and 9.17 cm in groups A, B, C and D, while the average keel length under treatments A, B, C and D was 8.33, 9.33, 9.57 and 10.18 cm, respectively (Table 1).

Tibia ash in the same order was 33.20, 34.76, 36.56, 38.17%, respectively. The average liver weight, heart weight and gizzard weight was 37.85, 38.70, 40.00 and 41.50 g; 9.66, 10.33, 10.66 and 11.55 g and 24.30, 25.66, 26.25 and 28.01 g in groups A, B, C and D, respectively (Table 1).

Statistical analysis of data regarding various carcass characteristics indicated significant ($P < 0.05$) differences in treatments. Highly significant ($P < 0.01$) differences were observed in edible meat percentage, bone meat ratio and keel length. As regards liver weight, heart weight and gizzard weight, non-significant differences were observed between treatments. These results conform to those of Bartove (1977) and Alisheihov (1980) who reported increased gain in liveweight, carcass quality of broilers with ascorbic acid supplementation.

The results are in agreement with those of Krautmann *et al.* (1990) who observed improved carcass yield following ascorbic acid supplementation in market broilers. The results are also in line with the findings of Rizvi (1990) who reported that there was significant increase in carcass quality of broilers supplemented with ascorbic acid as compared to non-supplemented group of broilers. Siddiqui (1991) also reported that the improvement in carcass weight ranged from 30-50 g per bird. The positive effect of vitamin C here may lie partly in preventing catabolism of protein and helping maintain the intracellular water concentration thus improving the carcass weight and the organoleptic properties of the meat.

Table 1. Average dressing percentage, edible meat percentage, bone meat ratio, shank and keel lengths, tibia ash and giblet weight as influenced by supplemental ascorbic acid

Description	Groups (ascorbic acid, ppm)			
	A (0)	B (1000)	C (1200)	D (1400)
Dressing percentage	68.70 c	70.71 bc	71.50 b	73.48 a
Edible meat percentage	58.70 c	62.54 b	63.66 b	66.65 a
Bone meat ratio	2.82 b	4.07 a	4.30 a	4.56 a
Shank length (cm)	7.62 b	8.65 a	9.03 a	9.17 a
Keel length (cm)	8.33 c	9.33 c	9.57 ab	10.18 a
Tibia ash (%)	33.20 c	34.76 bc	36.56 ab	38.17 a
Giblet weight (g)				
Liver weight	37.85	38.70	40.00	41.50 ^{NS}
Heart weight	9.66	10.33	10.66	11.55 ^{NS}
Gizzard weight	24.30	25.66	26.25	28.01 ^{NS}

The results of this study indicate that under conditions of heat stress during summer in tropics like Pakistan, biosynthesis of ascorbic acid in broiler chicken is not adequate according to the needs for optimal performance. Hence, exogenous supplementation of ascorbic acid in drinking water has shown to produce positive responsiveness in improving carcass characteristics in broilers.

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