

EFFECT OF SUPPLEMENTATION OF LYSINE ON CARCASS CHARACTERISTICS OF COMMERCIAL BROILERS

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Abstract: A growth trial of 6 weeks duration in broilers was conducted in a completely randomized design (CRD), comprising twelve dietary treatments; using 600 day-old commercial broiler chicks (Vencobb). The chicks were procured, wing banded, individually weighed and distributed randomly into twelve treatments, each treatment had ten replications with each replicate consisting of five chicks. The chicks were reared in battery brooders with optimum brooding conditions. The experimental diets were formulated with varying levels of lysine (1.18, 1.23, 1.28 and 1.33) during pre starter (0-14 d), (1.05, 1.08, 1.11 and 1.14) starter (15-28d) and (0.95, 0.98, 1.01 and 1.04) and finisher period (29-42d). Each level of lysine in all the three phases constituted three levels methionine (90, 100 and 110% of the cobb recommendation). The results of carcass studies reveals that the supplementation of lysine and methionine to broiler diets resulted in significant improvement in breast muscle yield, but the dressing percentage, weights of thigh yield, liver, heart and abdominal fat weight were unaffected.

Keywords: Lysine, broilers, amino acids, carcass characteristics.

Introduction

Worldwide poultry production has increased significantly over the past fifty years to accommodate increased demand for poultry products. Broiler chicks grow rapidly and typically receive diets high in protein or amino acids (ERS, USDA, 2001). Feed alone accounts for around 70 percent of the total cost of broiler production. Growing concerns about the environmental impact of animal production may lead to the addition of environmental concerns such as nitrogen and phosphorus pollution as parameters in feed formulation. Feeding optimum and balanced protein play an important role in precision nutrition. Protein is an essential constituent of all tissues of animal body and has major effect on growth performance of chicken (Kamran *et al.*, 2004). Utilization of digestible amino acids (DAA) concept may help in reducing the dietary protein and yet maintaining optimum chicken performance. Some of these advantages of DAA concept are diverting higher proportion of dietary amino acids (AA) for protein synthesis, reducing environmental pollution, reducing feed cost and decreasing the dietary requirements of the limiting amino

acid. Most of the broiler chicken diets are formulated with corn and soybean meal (SBM). The amino acid contents in such diets are not adequate to meet the requirements of current fast growing broilers for expressing their maximum genetic potential. Therefore, crystalline amino acids are supplemented to the corn-SBM based diets to meet the AA requirements. The concept of a requirement for dietary protein has been controversial since proteins are composed of amino acids and that some amino acids are dietary essentials for maximum growth and performance. The most of the previous studies on lowering the dietary protein level (DPL) with amino acid (AA) fortification in broiler chicks have been conducted worldwide under varied agro climatic conditions. Irrespective of level of nutritional inputs, the full genetic potential of the commercial meat type chickens may not be able to be expressed due to environmental constraints. Though, many scholars worldwide conducted biological trials on broilers with reducing the dietary protein level by supplementing the digestible amino acids. The present investigation was carried out to evaluate the effect of various levels of lysine supplementation on carcass characteristics of commercial broilers.

Materials and Methods

An experiment was conducted at the Poultry Experimental Station, Department of Poultry Science, College of Veterinary Science, Rajendranagar, Hyderabad-30 to assess the digestible lysine requirements of commercial broilers fed corn soya bean meal based diets.

A growth trial of 6 weeks duration in broilers was conducted in a completely randomized design (CRD), comprising twelve dietary treatments; using 600 day-old commercial broiler chicks (Vencobb). The chicks were procured, wing banded, individually weighed and distributed randomly into twelve treatments, each treatment had ten replications with each replicate consisting of five chicks. The chicks were reared in battery brooders with optimum brooding conditions.

The experimental diets were formulated with varying levels of lysine (1.18, 1.23, 1.28 and 1.33) during pre starter (0-14 d), (1.05, 1.08, 1.11 and 1.14) starter (15-28d) and (0.95, 0.98, 1.01 and 1.04) and finisher period (29-42d). Each level of lysine in all the three phases constituted three levels methionine (90, 100 and 110% of the cobb recommendation). The concentrations of all other essential nutrients of all experimental diets were maintained at constant levels as per the cob recommendation. The diets were prepared by using corn and soyabean meal as the major ingredients of the experimental diets.

The chicks of all the experimental groups were kept under standard management and proper hygienic conditions throughout the experimental period. Chicks were housed in a battery

brooder with a floor space of 0.5 sft / bird for brooding period and later given 1.0 sft / bird. During the experiment, light was provided continuously (24 hours) for first 2 weeks.

Feed and water were offered *ad libitum* throughout the experimental period. All the birds were raised under similar managemental conditions. During the experimental period, birds were immunized against Newcastle Disease (ND) at 7th (primary) and 28th (booster) day of age with LaSota vaccine (Indovax) and Infectious Bursal Disease with IBD (Intermediate-Georgia strain) vaccine at 14th (primary) and 21st (booster) day of age.

Slaughter parameters

Dressing Percentage: Immediately after dressing, carcass weight including kidneys and its fat weight was recorded with the help of electronic balance.

Abdominal fat: The fat in the abdomen surrounding viscera was removed manually and was collected after dressing and evisceration of the bird.

Breast Yield: The breast was separated from the back at the shoulder joint and by a cut running backward and downward from the point along the junction of the vertebral and sterna ribs. The breast was weighed separately to get the breast yield.

Weight of Giblet: Weight of giblet comprised of the total gizzard, heart and liver and expressed as grams per kg live weight.

Statistical analysis: The data were analyzed using one way ANOVA of Statistical Package for Social Sciences (SPSS) 15th version and comparison of means tested using Duncan's multiple range test and significance was considered at $P < 0.05$.

Results and Discussion

The results obtained in this experiment presented in the Table 1. The supplementation of standard and graded concentration of lysine to corn-soya based diets did not show any influence on dressing percent of broilers. It is observed that diets supplemented with standard lysine have resulted in higher but non-significant dressing percentage than the diets supplemented with more than the recommended levels. The supplementation of standard lysine significantly ($P < 0.05$) improved the breast yield and gizzard of broilers than the diets supplemented more than recommended levels of lysine. On the other hand, the standard and higher levels of lysine supplementation to the corn-soyabean meal diets did not result in any variation in weights of thigh, liver, heart and abdominal fat.

In the present study, lower dressing percentage was observed in birds fed on higher levels of lysine supplemented diet compared to those fed diets with standard lysine supplementation. These results showed that supplementation of high lysine diets did not improve the dressing

percentage of broilers. The results showed that higher levels of lysine and TSAA as methionine supplementation had no significant ($P>0.05$) effect on dressing percentage of the commercial broilers. These results are in agreement with those of Trindade Neto *et al.* (2011) and Onu *et al.* (2004) who reported that the supplementation of lysine and methionine in corn soya diets of broilers did not improve the dressing yield.

Increased breast yield was observed in the present study on supplementation with lysine and TSAA at recommended levels and more than recommended levels to the corn-soya based diets of broilers. These findings are in agreement with those of Nasar and Kheiri (2011), Bouyeh (2012) and Corzo *et al.* (2006), Sterling *et al.* (2006) and Hickling *et al.* (1990). The need for dietary lysine is greater for breast meat yield than for live performance (Kidd *et al.*, 1998).

The thigh yield was unaffected in the present study on supplementation with recommended levels of lysine and TSAA or more than recommended levels to the corn-soya based diets of broilers. These results are in agreement with the findings of Trindade Neto *et al.* (2011) and Onu *et al.* (2004). Abdominal fat weight was not affected by higher levels of lysine supplementation to broiler diets in the present study as was also reported by Trindade Neto *et al.* (2011) and Onu *et al.* (2004).

Table 1. Effect of supplementation of lysine on carcass characteristics and visceral organs (gm / kg live weight) of commercial broilers

Treatment	Dressing yield (%)	Breast (g/kg)	Thigh (g/kg)	Liver (g/kg)	Heart (g/kg)	Gizzard (g/kg)	Abdominal fat (g/kg)
T ₁	76.40	225.42 ^{ab}	202.50	16.03	4.33	17.17 ^a	14.97
T ₂	75.82	228.18 ^{ab}	199.29	18.08	4.57	15.09 ^{bcd}	16.59
T ₃	76.04	230.69 ^a	202.48	19.78	4.61	14.71 ^{cd}	14.01
T ₄	75.87	214.44 ^{abcde}	210.80	17.15	4.44	16.22 ^{abc}	15.45
T ₅	74.88	219.55 ^{abc}	202.63	17.25	4.85	15.24 ^{bcd}	17.35
T ₆	74.90	218.08 ^{abcd}	197.80	18.23	4.91	15.79 ^{abcd}	16.18
T ₇	73.74	197.45 ^c	206.11	18.13	4.14	14.00 ^d	14.20
T ₈	74.95	203.02 ^{cde}	206.90	16.42	4.12	15.18 ^{bcd}	15.91
T ₉	75.49	217.11 ^{abcd}	208.71	16.84	4.00	15.78 ^{abcd}	17.05
T ₁₀	74.02	199.48 ^{de}	207.03	18.63	4.46	16.35 ^{abc}	15.48
T ₁₁	75.62	220.45 ^{abc}	212.00	18.51	4.38	16.03 ^{abc}	14.88
T ₁₂	74.26	210.29 ^{bcd}	208.14	17.80	4.48	16.71 ^{ab}	16.99
SEM	0.314	1.912	1.103	0.268	0.063	0.175	0.364
n	10	10	10	10	10	10	10
P value	0.842	0.001	0.185	0.227	0.090	0.010	0.676

Note: Values bearing different superscripts within a column are significantly ($P < 0.05$) different

Visceral organ weights (liver and heart) were unaffected in the present study with the different levels of lysine and TSAA as methionine supplementation to the broiler chicks. These results are in agreement with those of Onu *et al.* (2004) and Trindade Neto *et al.* (2011) who reported that standard lysine or more than the recommended lysine and TSAA as methionine supplementation to the broilers had no effect on edible organ weights. Increased gizzard weight was observed in the present study in all the treatments studied. These results are in agreement with those of Nasar and Kheiri (2011).

Conclusion

From the results of this experiment, it is concluded that the supplementation of lysine and TSAA as methionine to broiler diets resulted in significant ($P < 0.05$) improvement in breast muscle yield, gizzard weight, but the dressing percentage, weights of thigh yield, liver, heart and abdominal fat weight were unaffected.

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