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D Rambabu
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

V Ravinder Reddy
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

SV Rama Rao
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

J Narasimha
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

M Shashi Kumar
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

Corresponding Author
D Rambabu
Department of Poultry Science, College of Veterinary Science, P.V. Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad, Telangana, India

Effect of supplementation of digestible lysine on carcass characteristics of commercial broilers

D Rambabu, V Ravinder Reddy, SV Rama Rao, J Narasimha and M Shashi Kumar

Abstract
Using 600 day-old commercial broiler chicks, a 6-week growth trial in broilers was undertaken in a completely randomized design (CRD) with twelve nutritional treatments (Ven Cobb). The chicks were purchased, wing banded, individually weighed, and randomly assigned to one of twelve treatments, each with ten replications and five chicks per duplicate. The chicks were raised in battery brooders that provided the best brooding conditions possible. During the pre-starter (0-14 days), starter (15-28 days), and finisher (0.95, 0.98, 1.01, and 1.04) periods, the experimental diets were created with varied quantities of lysine (1.18, 1.23, 1.28, and 1.33). (29-42d). In all three phases, each level of lysine equaled three levels of methionine (90, 100 and 110 percent of the Cobb recommendation). The addition of lysine and methionine to broiler diets resulted in a considerable increase in breast muscle yield, but had no effect on dressing percentage, thigh yield, liver, heart, or abdominal fat weight, according to carcass studies.

Keywords: digestible lysine, broilers, amino acids, carcass characteristics, giblets

Introduction
To meet rising demand for poultry products, global poultry production has expanded dramatically during the last fifty years. Broiler chicks grow quickly and are fed a high-protein, high-amino-acid diet (ERS, USDA, 2001) [2]. The cost of feed accounts for roughly 70% of the entire cost of broiler production. Environmental problems, such as nitrogen and phosphorus contamination, may be added as criteria in feed formulation as a result of growing worries about the environmental impact of animal agriculture. Precision nutrition necessitates the consumption of optimal and well-balanced protein. Protein is a vital component of all tissues in an animal's body and has a significant impact on chicken growth (Kamran *et al*., 2004). The use of the digestible amino acids (DAA) approach could assist reduce dietary protein while still ensuring optimal chicken performance. Diverting a higher proportion of dietary amino acids (AA) for protein synthesis, reducing environmental pollution, lowering feed costs, and lowering the dietary needs of the limiting amino acid are only a few of the benefits of the DAA idea. Corn and soybean meal are commonly used in broiler chicken diets (SBM). The amino acid content of such diets is insufficient to meet the needs of today's fast-growing broilers in terms of expressing their genetic potential. To achieve the AA needs, crystalline amino acids are supplied to the corn-SBM based diets. Since proteins are made up of amino acids, and specific amino acids are dietary needs for maximal growth and performance, the concept of a dietary protein requirement has been disputed. The majority of prior investigations on reducing the dietary protein level (DPL) in broiler chicks with amino acid (AA) fortification have been undertaken globally under a variety of agro-climatic situations. Due to environmental limits, the complete genetic potential of commercial meat type hens may not be able to be developed, regardless of the degree of nutritional inputs. Many researchers throughout the world have done biological tests on broilers with the goal of lowering dietary protein levels by adding digestible amino acids. The goal of this study was to see how different doses of lysine supplementation affected the carcass characteristics of commercial broilers.

Materials and Methods
To determine the digestible lysine requirements of commercial broilers given maize soya bean meal-based diets, an experiment was undertaken at the Poultry Experimental Station, Department of Poultry Science, College of Veterinary Science, Rajendranagar, Hyderabad-30. Using 600 day-old commercial broiler chicks, a 6-week growth trial in broilers was undertaken

in a completely randomized design (CRD) with twelve nutritional treatments (Ven Cobb). The chicks were purchased, wing banded, individually weighed, and randomly assigned to one of twelve treatments, each with ten replications and five chicks per duplicate. The chicks were raised in battery brooders that provided the best brooding conditions possible.

During the pre-starter (0-14 days), starter (15-28 days), and finisher (0.95, 0.98, 1.01, and 1.04) periods, the experimental diets were created with varied quantities of lysine (1.18, 1.23, 1.28, and 1.33). (29-42d). In all three phases, each level of lysine equaled three levels of methionine (90, 100 and 110 percent of the Cobb recommendation). All other critical nutrient concentrations in all experimental diets were maintained at constant amounts, as recommended by the cob. Corn and soy bean meal were used as the main ingredients in the experimental diets.

Throughout the experiment, all of the experimental groups' chicks were kept under standard management and hygienic circumstances. For the brooding stage, chicks were housed in a battery brooder with a floor space of 0.5 sft / bird, and then given 1.0 sft / bird. For the first two weeks of the experiment, light was delivered continuously (24 hours). Throughout the trial, the animals were given unlimited amounts of food and water. All of the birds were reared under the same conditions. During the study, birds were inoculated against Newcastle Disease (ND) with La Sota vaccine (Indovax) on the 7th (primary) and 28th (booster) day of life, and against Infectious Bursal Disease with IBD (Intermediate-Georgia strain) vaccine on the 14th (primary) and 21st (booster) day of life.

Slaughter parameters

Dressing Percentage: Using an electronic balance, the carcass weight, including kidneys and fat, was recorded immediately after dressing. After dressing and evisceration of the bird, the fat in the belly around the viscera was manually removed and collected.

Breast Yield: A cut running backward and downward from the point along the junction of the vertebral and sterna ribs divided the breast 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. To calculate the breast yield, each breast was weighed separately.

Giblet Weight: Giblet weight is measured in grams per kilogram of live weight and includes the whole gizzard, heart, and liver.

Statistical analysis: The data were analyzed using one way ANOVA in the Statistical Package for Social Sciences (SPSS) 15th version, with Duncan's multiple range test used to compare means, with significance set at $P<0.05$.

Results and Discussion

The findings of this experiment are provided in Table 1. Supplementation of standard and graded lysine concentrations to corn-soya based diets had little effect on broiler dressing percentages. Diets supplemented with standard lysine had a greater but not statistically significant dressing percentage than diets supplemented with more than the recommended amounts. Standard lysine supplementation improved the breast production and gizzard of broilers significantly (P0.05) compared to diets treated with greater than recommended doses of lysine. Standard and higher amounts of lysine addition to the corn-soy bean meal diets, on the other hand, had no effect on thigh, liver, heart, or abdominal fat weights.

In this study, birds fed meals with higher levels of lysine supplementation had lower dressing percentages than those provided diets with regular lysine supplementation. Supplementation of high-lysine diets did not increase broiler dressing percentages, according to these findings. Higher amounts of lysine and TSAA as methionine supplementation had no significant ($P>0.05$) effect on the dressing percentage of commercial broilers, according to the findings. These findings are consistent with those of Trindade Neto *et al*. (2011) [10] and Onu *et al*. (2004) [8], who found that adding lysine and methionine to broiler maize soya diets did not improve dressing yield.

Supplementing the corn-soya based diets of broilers with lysine and TSAA at recommended levels and more than indicated levels resulted in increased breast yield in the current study. Nasar and Kheiri (2011), Bouyeh (2012), Corzo *et al*. (2006) [1], Sterling *et al*. (2006) [9], and Hickling *et al*. (1990) [4] all came to similar conclusions (1990). For breast meat yield, dietary lysine is more important than for live performance (Kidd *et al*., 1998) [6].

In the current investigation, supplementing corn-soya based broiler diets with approved levels of lysine and TSAA or higher than suggested levels had no effect on thigh yield. These findings are similar to those of Trindade Neto *et al*. (2011) [10] and Onu *et al* (2004) [8]. Higher doses of lysine supplementation to broiler diets had no effect on abdominal fat weight in the current investigation, as reported by Trindade Neto *et al*. (2011) [10] and Onu *et al* (2004) [8]. In this study, varying amounts of lysine and TSAA as methionine supplementation to broiler chicks had no effect on visceral organ weights (liver and heart).

These findings are consistent with those of Onu *et al*. (2004) [8] and Trindade Neto *et al*. (2011) [10], who found that supplementing broilers with regular lysine or more than the recommended lysine and TSAA as methionine had no influence on edible organ weights. In the current study, all of the treatments resulted in increased gizzard weight. These findings are consistent with Nasar and Kheiri's findings (2011).

Table 1: Shows the effect of lysine supplementation on carcass parameters and visceral organs in commercial broilers (grammes / kg live weight).

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^{e}	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^{bcde}	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

Conclusion

The addition of lysine and TSAA as methionine to broiler diets resulted in a significant (P 0.05) increase in breast muscle yield and gizzard weight, but had no effect on dressing percentage, thigh yield, liver, heart, or abdominal fat weight.

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