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Carcass Characteristics and Physico-chemical Properties of Broiler Meat as Influenced by Triphala in Commercial Broiler Chicken

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A B S T R A C T

The biological experiment was carried out to determine the carcass characteristics and physico-chemical properties of broiler chicken meat as influenced by Triphala supplementation in broilers. The study was carried out with three hundred commercial sexed, one day-old, broiler chicks that were randomly grouped into six treatments with five replicates for each treatment containing ten chicks per replicate. The chicks were reared from day-old to thirty five days of age in deep litter system under standard management conditions throughout the experimental period. The treatment groups were fed with basal diet without supplementation of antibiotic growth promoter/Triphala (T_1) or with supplementation of oxytetracycline at 0.004 per cent (T_2), or with supplementation of Triphala at 0.025 per cent (T_3), 0.05 per cent (T_4), 0.075 per cent (T_5) or 0.10 per cent (T_6). At the end of the experiment (35^{th} day), one male and one female bird per replicate, totally ten birds per treatment group were randomly selected. Blood samples were collected for immunological and serum lipid profile study. The experiment revealed that there were no significant difference in carcass characteristics *viz.* eviscerated yield, yield of gizzard, heart and abdominal fat, except liver weight, in which it was found to be significantly ($P<0.01$) highest in group supplemented with Triphala at 0.10 per cent (T_6) and lowest in control (T_1). There existed no significant differences among treatment groups in physico-chemical properties of breast meat of broiler chicken due to supplementation of graded levels of Triphala for a period of five weeks.

Introduction

In India, broiler industry is one of the fastest growing sectors and has attained fourth place in broiler meat production at present in the world. The country has a higher demand of animal protein due to its high population. Chicken meat has become the most common source of animal protein, because the chicken meat is cheaper and has no religious taboo for consumption. The quality of broiler meat is becoming a major issue for the poultry industry. The continued exploration of genetic potential and expansion of knowledge on poultry nutrition made the maximum market weight achievable in five weeks of age. It has all been known that Triphala (in Sanskrit, "tri" means three, and "phala" means fruits),

is an important rasayana drug in the traditional Indian System of Medicine, the Ayurveda (Baliga *et al.,* 2012). It is a mixture of the dried powders of the three fruits such as *Emblica officinalis* (*Amla*/ *Nellikkaai*), *Terminalia chebula* (*Haritaki*/ *Kadukkaai*) and *Terminalia bellerica* (*Bibhitaki*/ *Thaandrikkaai*) and in which dried pericarps of the three myrobalans are included at 1:1:1 proportion. Triphala is rich in various phytochemicals including the tannins, phenolics, saponins, flavonoids, gallic acid, chebulagic acid, chebulinic acid, vitamin C *etc*. Triphala preparation is used in human ayurvedic treatments to cure gastro-intestinal disorders and it is considered as the "Cure for all diseases". Considering upon the possible beneficial effects of Triphala through dietary supplementation in broiler chicken, this research trial is carried out to assess the carcass characteristics and physico-chemical properties of broiler chicken meat as influenced by Triphala in commercial broiler chicken.

Materials and Methods

Biological Experiment

The biological experiment was carried out with three hundred, sex separated and commercial (Vencobb 400) broiler chicken belonging to single hatch. The whole experimental period was divided into three phases *viz.*, pre-starter (1 to 12 days), starter (13 to 24 days) and finisher phase (25 to 35 days). All the chicks were reared from 0 days to five weeks of age under deep litter in an open sided housing system under standard management conditions. The experimental chicks were wing banded, weighed and randomly allotted into six treatment groups. Each treatment had five replicates with ten chicks per replicate comprising fifty chicks per treatment. The experimental broiler chicks were vaccinated intra-ocularly with New Castle disease vaccine (B_1 strain), Infectious Bursal disease vaccine (Intermediate Georgia live strain) and New Castle disease vaccine *('La Sota'* strain) at 7^{th}, 14^{th} and 21^{st} day of age, respectively.

Experimental diet

A basal diet was formulated according to the Vencobb standard, without supplementation of antibiotic growth promoter or Triphala. The experimental diets were prepared by supplementing the basal diet with antibiotic growth promoter (Oxytetracycline @ 0.004 per cent) or Triphala at 0.025, 0.050**,** 0.075 or 0.10 per cent levels. The control group (T_1) was fed with basal diet without any supplementation and the treatment groups were fed with antibiotic growth promoter (T_2) and Triphala at 0.025, 0.05, 0.075 and 0.10 percent (T_3, T_4, T_5 and T_6) in the basal diet, respectively.

Carcass characteristics

At the end of the experiment (35^{th} day), one male and one female bird per replicate, totally ten birds per treatment group were randomly selected. The birds were slaughtered as per the method of Arumugam and Panda (1970). The eviscerated carcass weight, weight of gizzard, liver, heart and abdominal fat were recorded and expressed as percentage of pre-slaughter live weight.

Physico-chemical properties of meat

The breast meat samples collected during the slaughter studies were analyzed for physical and chemical properties *viz.* pH, water-holding capacity, extract release volume and their chemical properties *viz.*, thiobarbituric acid and tyrosine values. The physical properties of the breast meat were analyzed on the day of slaughter (0^{th} day). The meat was stored at -19 ºC for 45 days and the

chemical properties were assessed on the breast meat at 45th day post-slaughter.

Meat pH

The fresh meat sample (5g) collected immediately after slaughter was minced and taken in a beaker containing 45ml of double glass distilled water (pH – 6.7). The pH of meat was estimated using Oaklon multi parameter PCS^{TM}35.

Water holding capacity

The estimation of water holding capacity was carried out by adopting the filter paper press method recommended by Grau and Hamm (1957) with modification. Accurately 300mg meat was kept in-between a folded Whatman No.41 filter paper. The folded filter paper with meat was then kept in-between two glass slides. The muscle tissue was subjected to a downward force by placing a 100g weight on the top of the upper glass slide for 3 minutes. The area of the two resultant wet impressions was expressed in square centimeter.

Extract release volume

Accurately 20 g meat sample was homogenized with 100ml distilled water for 2 minutes. The homogenate was directly poured into a funnel lined with Whatman filter paper No. 1, folded thrice to make eight sections. The homogenate was allowed to seep between the folds and the extract was collected in 100 ml graduated cylinder for 15 minutes (Food Safety and Standards Authority of India, 2012).

Thiobarbituric acid value

The TBA value was estimated by using solvent trichloroacetic acid for extraction as described by Witte *et al.,* (1970).

Tyrosine value

The tyrosine value was estimated from the muscle sample, as per the techniques of Strange *et al.,* (1977). The data collected on various response criteria were subjected to statistical analysis in Completely Randomized Design (CRD) as per the methods suggested by Snedecor and Cochran (1989).

Results and Discussion

Carcass characteristics and Physico-chemical properties of broiler meat

The mean (± S.E.) carcass characteristics of broiler chicken (expressed as percentage of pre-slaughter live weight) at 35th day of age, as influenced by dietary supplementation of graded levels of Triphala is presented in Table 1. The analysis of variance of data on carcass characteristics revealed no significant difference among different treatment groups due to supplementation of Triphala, in percentage yield of eviscerated carcass, gizzard, heart and abdominal fat, except the percentage yield of liver.

The percentage yield of liver was significantly ($P<0.01$) highest in the group supplemented with 0.10 per cent dietary Triphala (T_6) and was lowest in control group without antibiotic growth promoter or Triphala supplementation (T_1). The other treatment groups supplemented either with antibiotic growth promoter (T_2) or Triphala at 0.025, 0.05 and 0.075 per cent in diet (T_3, T_4 and T_5) did not differ significantly either with T_1 or T_6.

The result of present study is in agreement with earlier findings of Bhattacharya *et al.,* (2015) and Gaikwad *et al.,* (2016) who found no significant differences in carcass dressing per cent among the treatment groups. Priya (2016) also found no significant differences in

eviscerated percentage of broilers due to supplementation of Triphala. On contrary, Shivakumar *et al.*, (2005), Sanjyal and Sapkota (2011), and Mandal *et al.*, (2017) obtained higher dressing percentage due to phytobiotic supplementation in the diet of broilers compared to the unsupplemented groups.

Table.1 Mean (± S.E.) Carcass characteristics of broiler chicken (expressed as percentage of pre-slaughter live weight) as influenced by dietary supplementation of graded levels of Triphala

Treatment groups	Eviscerated carcass	Gizzard	Liver	Heart	Abdominal Fat
T_1	72.61 ± 1.39	2.10 ± 0.07	2.13^{B} ± 0.05	0.79 ± 0.04	1.28 ± 0.08
T_2	74.01 ± 1.94	2.30 ± 0.12	2.39^{AB} ± 0.14	0.92 ± 0.03	1.24 ± 0.14
T_3	71.96 ± 0.44	2.33 ± 0.05	2.39^{AB} ± 0.05	0.86 ± 0.04	1.13 ± 0.07
T_4	71.86 ± 2.13	2.22 ± 0.10	2.35^{AB} ± 0.10	0.86 ± 0.05	1.15 ± 0.10
T_5	72.14 ± 0.31	2.08 ± 0.07	2.17^{AB} ± 0.07	0.79 ± 0.04	0.98 ± 0.07
T_6	71.75 ± 0.57	2.10 ± 0.06	2.52^{A} ± 0.09	0.84 ± 0.06	1.17 ± 0.13

Value given in each cell is the mean of 10 observations

^{A,B} Means within a column with no common superscript differ significantly (P<0.01)

Table.2 Mean (± S.E.) Physico-chemical properties of breast meat of broiler chicken as influenced by dietary supplementation of graded levels of Triphala

Treatment groups	Physical properties			Chemical properties	
	pH	Water Holding Capacity (%)	Extract Release Volume (ml)	Thiobarbituric Acid Value (mg%)	Tyrosine Value (mg%)
T_1	6.32 ± 0.03	59.00 ± 3.71	32.83 ± 0.87	0.75 ± 0.04	34.12 ± 2.43
T_2	6.26 ± 0.03	60.00 ± 3.27	31.67 ± 0.96	0.83 ± 0.03	32.92 ± 1.90
T_3	6.25 ± 0.04	60.00 ± 2.25	32.33 ± 0.49	0.77 ± 0.06	30.56 ± 1.99
T_4	6.25 ± 0.04	58.00 ± 1.63	31.83 ± 0.31	0.76 ± 0.06	31.96 ± 1.25
T_5	6.32 ± 0.05	61.67 ± 2.60	32.17 ± 0.60	0.81 ± 0.06	30.01 ± 1.58
T_6	6.30 ± 0.02	61.33 ± 3.52	31.50 ± 0.96	0.87 ± 0.08	29.20 ± 1.11

Value given in each cell is the mean of 6 observations

The mean (± S.E.) physico-chemical properties of breast meat of broiler chicken as influenced by dietary supplementation of graded levels of Triphala is given in the Table 2. Statistical analysis revealed no significant differences among the various treatment groups on the physical properties *viz.* meat pH, water holding capacity, extract release volume and chemical properties *viz.* thiobarbituric acid value and tyrosine value. The result of present study indicates that supplementation of either antibiotic growth promoter or Triphala at the inclusion levels has no influence on physical or chemical properties of broiler meat.

Based on the salient research findings, it was concluded that carcass characteristics revealed no significant difference among different treatment groups due to supplementation of Triphala, in percentage yield of eviscerated carcass, gizzard, heart and abdominal fat, except the percentage yield of liver. However, the percentage yield of liver was significantly ($P<0.01$) highest in the group supplemented with 0.10 per cent dietary Triphala (T_6) and was lowest in control group without antibiotic growth promoter or Triphala supplementation (T_1). Supplementation of either antibiotic growth promoter or Triphala at the inclusion levels had no influence on physical or chemical properties of broiler meat.

References

Arumugam, M.P. and B. Panda, 1970. Processing and inspection of poultry. Indian Veterinary and Research Institute, Izatnagar, UP.

Baliga, M.S., S. Meera and B. Mathai, 2012. Scientific validation of the ethnomedicinal properties of the Ayurvedic drug Triphala: A review. *Chin. J. Integr. Med*., 18(12): 946-954.

Bhattacharya, A., P.K. Shukla and M. Shukla, 2015. Effect of polyherbal phytobiotic on the growth, immunocompetence, development of digestive organs and carcass characteristics of commercial broilers. *J. Anim. Res.*, 5(2): 347-351.

Food Safety and Standards Authority of India, Ministry of Health and Family Welfare, Government of India, New Delhi, 2012. Manual of methods of analysis of foods - Meat and meat products & fish and fish products, Lab Manual. 6: 28.

Gaikwad, D.S., S.P. Nage and S.D. Chavan, 2016. Effect of supplementation of Amla (*Emblica officinalis*) on growth performance of broilers. *Int. J. Tropical Agri.*, 34(3): 679-683.

Grau and Hamm 1957, Cited by Hamm. R., 1960. *Adv. Food Res*., Academic Press, New York and London, 10: 356.

Mandal, A.B., R. Kulkarni, J.J. Rokade, S.K. Bhanja and R. Singh, 2017. Effect of dietary addition of Amla (*Emblica officinalis*) on performance and HSP70 gene expression in coloured broiler chicken during extreme summer. *J. Anim. Res*., 7(2): 233-241.

Priya, J., 2016. Studies on dietary supplementation of *Panchagavya* and Triphala in broiler chicken - growth performance, serum biochemistry, gut microflora and histomorphometry. Ph. D. Thesis, University of Madras.

Sanjyal, S. and S. Sapkota, 2011. Supplementation of broilers diet with different sources of growth promoters. *Nepal J. Sci. Tech*., 12: 41-50.

Shivakumar, M.C., J. Mulla, B.K. Pugashetti and S. Nidgundi, 2005. Influence of supplementation of herbal growth promoter on growth and performance of broilers. *Karnataka J. Agric. Sci.*, 18(2): 481-484.

Snedecor, G.W. and W.G. Cochran, 1989. Statistical Methods. 8th Edn., Iowa state university press, Ames, USA. Iowa - 50010.

Strange E.D., R.C. Benedict, J.L. Smith and G.E. Swift, 1977. Evaluation of rapid tests for monitoring alteration in meat quality during storage. *I. Intact Meat. J. Food Prot.*, 40: 843-847.

Witte, V.C., G.F. Krauze and M.E. Bailey, 1970. A new extraction method for determining 2-thiobarbituric acid values of pork and beef during storage. *J. Food Sci*., 35: 582-585.

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