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Effect of Shatavari (*Asparagus racemosus*) supplementation on carcass characteristics and proximate composition of broiler chicken meat

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Abstract

Two hundred and twenty-five, day old unsexed broiler chicks were randomly allotted to 5 treatments with 3 replicates, each consisting of 15 broilers to study the effect of Shatavari (*Asparagus racemosus*) supplementation on the carcass characteristics and proximate composition of broiler chicken meat. The chicks were fed with standard basal diets in three different growth phases i.e. pre-starter (0-7day), starter (8-21day) and finisher (22-42 day). The treatments included the control group (T₁ - basal diet) and four groups with basal diet mixed with Shatavari powder @ 0.5% (T₂), @ 1% (T₃), 1.5% (T₄) and @ 2% (T₅) in feed, respectively. At the end of the experiment 9 birds per treatment (three from each replicate) were randomly selected. The birds were kept off feed for 12 hours prior to their sacrifice, but water was given *ad libitum*. Weight of the birds, before and after fasting, was recorded. Carcass yield of broilers did not differ significantly among various treatment groups. The mean value for dressing percentage, drawn percentage, eviscerated percentage and giblet percentage varied and were comparable among the different treatment groups. The meat bone ratios also had non-significant differences among different treatments. In thigh as well as breast portion moisture, protein, fat and ash values were non-significantly differ.

Keywords: Shatavari, broilers, carcass yield, meat bone ratios

Introduction

Feed supplement or additive is a substance or mixture used in minor quantity other than basic feed ingredients in order to complement certain nutrients for improving performance of birds (Narhari 1992) [15]. Growth promoters are agents added to poultry feeds in order to enhance the feed conversion efficiency and body growth and broadly can be categorized as Antibiotic growth promoters (AGP) and Non-Antibiotic growth promoters (NAGP). In the past, the major growth promoters were antibiotics as antibiotic growth promoters have been helpful in improvement of growth performance and feed conversion ratio in poultry (Miles *et al.*, 2006; Dibner and Buttin, 2002 and Izat *et al.*, 1990) [14, 8, 12]. However, constant treatment of poultry by antibiotics may result in residues of these substances in poultry products and bacterial resistance against treatments in human body. Due to such threats to human health, use of antibiotics in poultry is banned in many countries (Owens *et al.*, 2008; Alcicek *et al.*, 2004; Botsoglou and Fletouris 2001 and Hinton, 1988) [16, 1, 5, 11]. On the other hand, use of NAGP is commonly regarded as favourable alternatives to AGP in poultry production. The main advantage of NAGP over AGP is that they usually do not bear any risk regarding bacterial resistance or undesired residues in meat. Addition of NAGP to feed of poultry may have a number of beneficial effects, including rapid development of a healthy gut microflora and stabilization of digestion along with improved feed efficiency. NAGP include predominantly organic acids, probiotics, prebiotics, synbiotics, phytochemicals, feed enzymes and immune stimulants. Among these alternatives, phytochemicals are drawing much attention now-a-days. Shatavari (*Asparagus racemosus*) is the one of most commonly used herb in traditional medicine due to presence of steroidal saponins and saponinogenins in various part of plant (Krishana *et al.*, 2005) [13]. Traditionally it is used as health tonic (Pandey and Nighantu, 1998) [17] and common Indian home remedy used as rejuvenator, promoter of strength, breast milk and semen (Dash, 1991) [7]. The tuberous root of Shatavari (*Asparagus racemosus*) is well known for its galactagogue and anabolic activity (Chopra *et al.*, 1956) [6] and it appears in many Ayurvedic preparations as growth promoter and immune-stimulant.

Keeping in view the facts stated above, the present study was planned to observe the effect of supplementation of Shatavari on the carcass characteristics and proximate composition of broiler chicken meat.

Materials and methods

The present research work was conducted for 42 days starting from Sep 06, 2017 at the Poultry section of the Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar, with prior approval by the Institutional Animal Ethics Committee.

Two hundred and twenty-five, day old unsexed broiler chicks of Ven-Cobb strain-400 were used on a completely randomized design in five treatments groups each having 45 chicks and each group was further divided into three replicates of 15 chicks each. The treatments included the control group (T₁ -basal diet as per BIS, 2007 specifications) and four groups with basal diet mixed with Shatavari powder @ 0.5% (T₂), @ 1% (T₃), 1.5% (T₄) and @ 2% (T₅) in feed, respectively. The chicks were routinely vaccinated and reared under strict hygienic conditions maintaining all standard managemental practices including brooding, lighting, litter management, cleaning of feeders and drinkers etc.

Observations recorded

Carcass characteristics

At the end of the experiment 9 birds per treatment (three from each replicate) were randomly selected. The birds were kept off feed for 12 hours prior to their sacrifice, but water was given *ad libitum*. Weight of the birds, before and after fasting, was recorded. Immediately after recording their live weights, the birds were slaughtered by severing the jugular vein at the atlanto-occipital joint and allowed to bleed completely. Later their heads were separated at atlanto-occipital joint and shanks were cut out at hock joints. After removal of skin along with feathers, the carcass weight was recorded. It is called dressed yield and expressed as per cent of pre-slaughter weight. Dressed birds were then eviscerated by removing the crop, trachea and viscera as a whole. A horizontal cut was given rear to the keel bone; thereby the breast was a little upturned and pushed forward, exposing the viscera along with the visceral organs, which were then removed completely by pulling. The lungs were scrapped off.

Heart, liver and gizzard constituting giblets, were removed carefully from the viscera. The gall bladder was removed with care from liver to avoid its rupture. The gizzard was opened and its contents were washed out and inner epithelial lining was discarded. The heart was made free from blood and adhering vessels. The eviscerated and drawn weights were recorded and their percentages were calculated. Similarly weight of giblets (heart, liver and gizzard) was recorded after washing and bloating, and giblet yield (percentage of live weight) was also calculated.

The musculature from breast area and the legs (thigh and drum-stick) was separated from the bones and meat bone ratios were recorded for these two parts as well as other cut up parts so as to calculate total meat bone ratio.

Dressed weight = Live weight – (Weight of blood + feathers + shanks + head)

$$\text{Dressing percentage} = \frac{\text{Dressed weight}}{\text{Live weight}} \times 100$$

Eviscerated weight = (Dressed weight – Weight of viscera)

$$\text{Eviscerated weight percentage} = \frac{\text{Eviscerated weight}}{\text{Live weight}} \times 100$$

Giblets weight = (Heart, liver and gizzard)

$$\text{Giblets percentage} = \frac{\text{Weight of giblets}}{\text{Live weight}} \times 100$$

Drawn weight = Eviscerated weight + weight of giblets

$$\text{Drawn percentage} = \frac{\text{Drawn weight}}{\text{Live weight}} \times 100$$

$$\text{Total meat bone ratio} = \frac{\text{Total meat weight}}{\text{Total bone weight}}$$

Nutritional quality parameters of the carcass

Samples of breast and thigh muscles were taken from each of the slaughtered birds and stored in deep-freeze separately for further analysis. These samples were analyzed for moisture, ash, protein and ether extract (fat) as per AOAC (2005).

a. Moisture

Minced sample (30 g) was weighed in dried aluminium dish and kept in hot air oven without lid at 100-105°C for 16-18 hours. After cooling in desiccator, loss in weight was calculated as moisture of the sample.

b. Protein

Reagents

- H₂SO₄ (concentrated)
- HCl (0.01N)
- Boric acid solution (4%)
- NaOH solution (40%)
- Catalyst : Copper sulphate and potassium sulphate (1:9)
- Mixed indicator: Two grams of methyl red and one gram of bromocresol green were dissolved in 1000 ml ethanol and stored in dark brown bottle.

Procedure

One gram of meat sample and 20 ml of concentrated H₂SO₄ were transferred to a Kjeldahl flask. A pinch of catalytic mixture was added and digestion was carried out till the appearance of blue green clear solution. After cooling, volume was made to 100 ml with distilled water. Five ml of aliquot was rendered alkaline by mixing with 15 ml of 40% NaOH solution and was distilled. Liberated ammonia was collected in a conical flask containing 10 ml of boric acid solution and 2-3 drops of mixed indicator. Contents of flask containing boric acid were titrated against 0.01N HCl.

$$\text{Protein (\%)} = \frac{\text{Amount of 0.01N HCl used} \times 0.00014 \times 100 \times 6.25 \times 100}{\text{Weight of sample} \times \text{ml of aliquot}}$$

c. Ether extracts (fat)

One gram of sample was taken in a previously weighed

extraction thimble made up of Whatman filter paper No.1. Extraction of the sample was done in Soxhlet's extraction apparatus for 6-8 hours by using petroleum ether (boiling point 60-80 °C). The thimble after extraction was taken out, dried in open air and then in hot air oven at about 100 °C for 1 hour. The loss in weight following extraction and drying was recorded and per cent ether extract was calculated.

d. Ash

One gram of sample was taken in a dried and weighed silica crucible. It was heated on a hot plate till smoking ceased and the sample became thoroughly charred. Charred sample was then kept in a muffle furnace at 600 °C for 1 hour. Crucible was cooled in desiccators and weighed. Ash was calculated as the difference between weight of empty crucible and weight after ashing.

Statistical analysis

Data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) [19] using Completely Randomized Design (CRD). All the data were subjected to ANOVA using the General Linear Models procedure of SAS

software (SAS Institute, 2003). The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a level of (P<0.05) was used as the criterion for statistical significance (Duncan, 1955) [19].

Results and discussion
Carcass characteristics

The carcass characteristics of broilers reared under different treatments, recorded at 42 days of age, have been presented in Table 1 and depicted in Fig. 1.

Carcass yield of broilers did not differ significantly among various treatment groups. The mean value for dressing percentage varied from 77.07% (T₂) to 78.04% (T₃), drawn percentage varied from 58.11% (T₂) to 58.84% (T₄), eviscerated percentage varied from 62.92% (T₂) to 64.20% (T₄) and giblet percentage varied from 4.81% (T₂) to 5.49% (T₅) and were comparable among the different treatment groups.

The meat bone ratios also had non-significant differences among different treatments, ranged from 3.31 (T₅) to 3.38 (T₃).

Table 1: Effect of Shatavari on mean carcass characteristics of broiler meat

Parameter	Treatments				
	T ₁	T ₂	T ₃	T ₄	T ₅
Dressing percentage	77.98 ± 0.45	77.07 ± 0.97	78.04 ± 1.03	77.71 ± 0.62	77.85 ± 0.63
Drawn percentage	58.38 ± 0.58	58.11 ± 0.90	58.55 ± 1.62	58.84 ± 1.52	58.12 ± 0.80
Eviscerated percentage	63.84 ± 0.35	62.92 ± 0.93	63.47 ± 1.40	64.20 ± 1.48	63.61 ± 0.68
Giblets percentage	5.46 ± 0.35	4.81 ± 0.22	4.93 ± 0.29	5.37 ± 0.11	5.49 ± 0.23
Meat : bone	3.36 ± 0.02	3.37 ± 0.02	3.38 ± 0.04	3.33 ± 0.02	3.31 ± 0.02

Values are means ± standard errors.

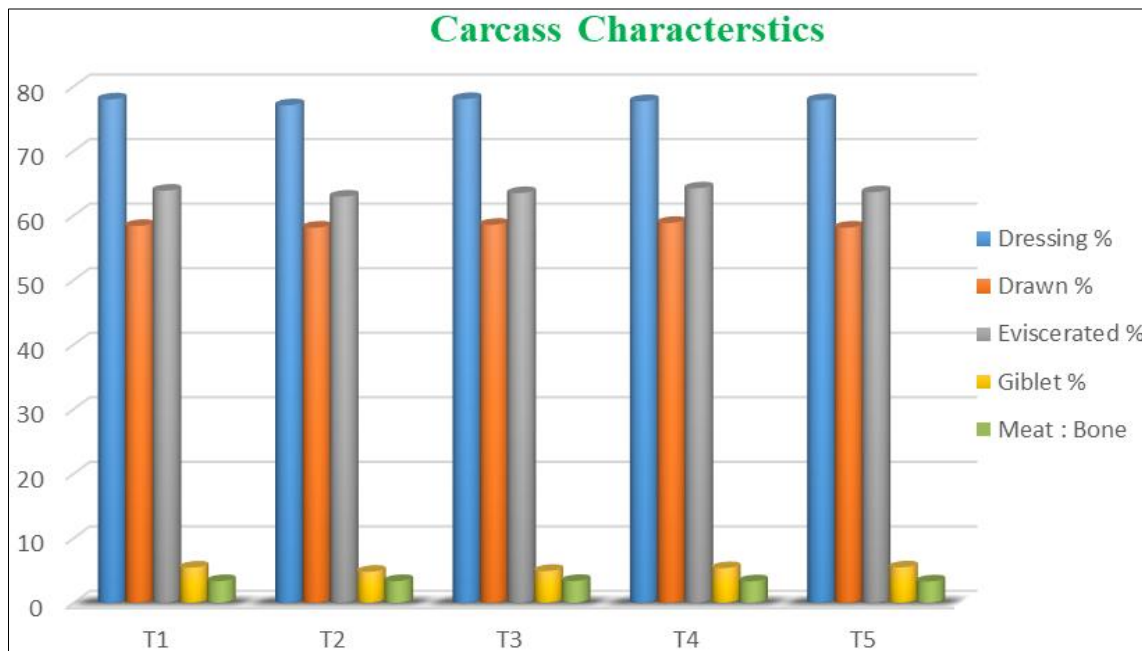


Fig 1: Effect of Shatavari on mean carcass characteristics of broiler meat

Proximate composition of broiler meat

The proximate composition of broiler meat (thigh and breast portion) supplemented with Shatavari is presented in Table 2 and depicted in Fig. 2.

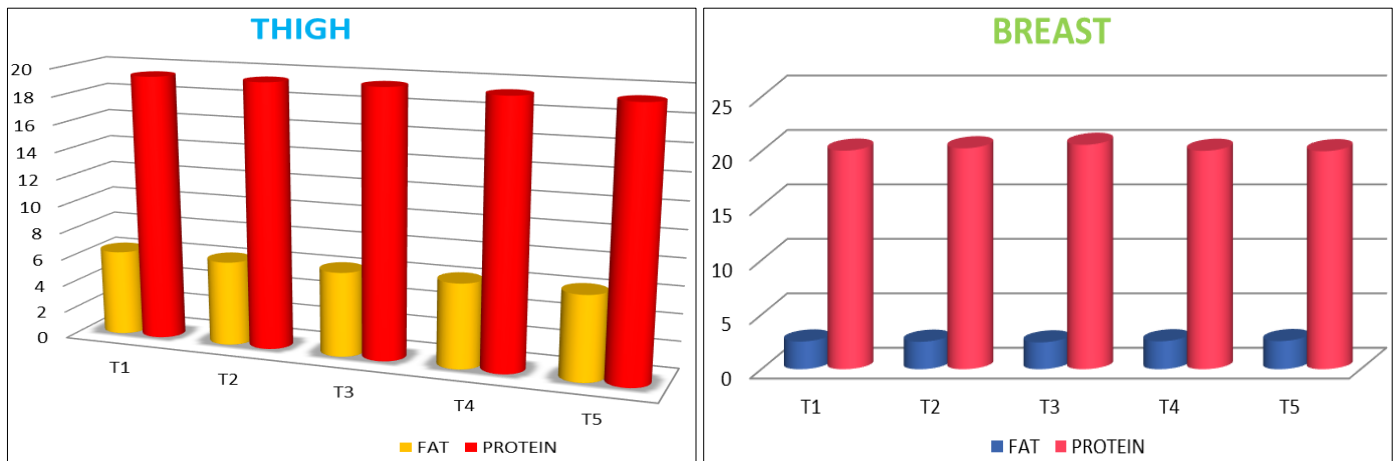
In thigh portion moisture, protein, fat and ash values were non-significantly different, ranging from 72.42 (T₃) to 72.66

(T₅), 19.34 (T₄) to 19.51 (T₃), 6.24 (T₁ and T₅) to 6.29 (T₃) and 1.23 (T₂ and T₃) to 1.25 (T₅), respectively. Similarly, in breast portion moisture, protein, fat and ash values were non-significantly different, ranging from 74.80 (T₃) to 75.23 (T₄), 20.01 (T₅) to 20.60 (T₃), 2.46 (T₁) to 2.58 (T₃) and 1.47 (T₃) to 1.82 (T₄), respectively.

Table 2: Effect of Shatavari on mean proximate composition of broiler meat (thigh and breast)

Portion	Parameter	Treatments				
		T ₁	T ₂	T ₃	T ₄	T ₅
Thigh	Moisture	72.65 ± 0.04	72.44 ± 0.28	72.42 ± 0.23	72.65 ± 0.37	72.66 ± 0.11
	Protein	19.43 ± 0.21	19.43 ± 0.11	19.51 ± 0.03	19.34 ± 0.25	19.35 ± 0.06
	Fat	6.29 ± 0.08	6.24 ± 0.12	6.24 ± 0.02	6.25 ± 0.09	6.25 ± 0.13
	Ash	1.24 ± 0.02	1.23 ± 0.01	1.23 ± 0.01	1.24 ± 0.02	1.25 ± 0.03
Breast	Moisture	75.19 ± 0.17	74.84 ± 0.04	74.80 ± 0.08	75.23 ± 0.04	75.18 ± 0.40
	Protein	20.06 ± 0.06	20.28 ± 0.12	20.60 ± 0.29	20.05 ± 0.13	20.01 ± 0.26
	Fat	2.54 ± 0.05	2.52 ± 0.03	2.46 ± 0.11	2.56 ± 0.06	2.58 ± 0.05
	Ash	1.72 ± 0.05	1.61 ± 0.14	1.47 ± 0.12	1.82 ± 0.04	1.58 ± 0.13

Values are means ± standard errors.

**Fig 2:** Effect of Shatavari on mean proximate composition of broiler meat

The above findings were in agreement with study of Pedulwar *et al.* (2007) [18]; Srivastava *et al.* (2013) [20] and Gaikwad *et al.* (2015) [10]. They concluded that the differences in carcass characteristics among all the treatment groups were found to be non-significant whereas, numerically higher dressing percentage was recorded in treatment supplemented with 1% level of Shatavari.

Similarly, Anurag Dwivedi (2013) [2] observed an increase in dressing weight and eviscerated weight percentage due to supplementation of Shatavari upto 1% level and there after a gradual decrease. The mean value become even lower than control in treatment subjected 2% level of Shatavari supplementation.

Results of this study are in agreement with the findings of the earlier researchers. Increased protein content in 1% Shatavari supplemented treatment may be attributed to increased muscle mass formation facilitated by Shatavari supplementation.

Conclusion

The present study revealed that Shatavari supplementation exhibited non-significant difference among various treatments on percent dressing weight, eviscerated weight, giblet weight and drawn weight. No effect of adding Shatavari in the diet of birds was observed on meat bone ratio of different treatments. The proximate analysis of meat of thigh and breast portion showed non-significant difference in moisture, protein, fat and ash values among treatment groups. Protein and fat values in leg and breast meat were found to be better in 1% Shatavari in comparison to other treatments.

References

1. Alcicek A, Bozkurt M, Cabuk M. The effect of a mixture of herbal essential oils, an organic acid or a probiotic on

broiler performance. *S. Afr. J Anim. Sci.* 2004; 34:217-222.

- Anurag Dwivedi. Effect of feeding Shatavari (*Asparagus racemosus*) and Yeast (*Saccharomyces cerevisiae*) alone and in combination on the performance of broiler chicks. M.V.Sc. Thesis ((Animal Nutrition), RAJUVAS, Bikaner, 2013.
- AOAC. Official methods of analysis, 18th edition. Association of official analytical chemists. Gaithersburg, Maryland, USA, 2005.
- BIS. Requirement for chicken feeds. IS: 1374-2007, Manak Bhawan, 9 Bahadurshah Zafar Marg, New Delhi-110001, 2007.
- Botsoglou NA, Fletouris DJ. Drug Residues in Foods: Pharmacology, Food Safety and Analysis. Marcel Dekker, Inc. Publ., New York, USA, 2001.
- Chopra RN, Nayar SL, Chopra IC, Asolkar LV, Kakkar KK. Glossary of Indian Medicinal Plants, CSIR, New Delhi, 1956; 28:150-176.
- Dash VB. Materia Medica of Ayurveda. New Delhi, India. B. Jam Publishers Pvt. Ltd, 1991, 61.
- Dibner JJ, Buttin P. Use of organic acid as a model to study the impact of gut microflora on nutrition and metabolism. *J Appl. Poultry Res.* 2002; 11:453-463.
- Duncan DB. Multiple range and multiple F tests. *Biometrics.* 1955; 11(1):1-42.
- Gaikwad DS, Nage SP, Chavan SD, Jadhav DB. Effect of supplementation of Shatavari root powder on broiler characteristics and economics of Vencobb-400 chicks. *The Ecoscan.* 2015; 7:259-262.
- Hinton MH. (). Antibiotics, poultry production and public health. *World Poultry Sci. J.* 1988; 44:67-69.
- Izat AL, Colberg M, Reiber MA, Adams MH. Effects of

- different antibiotics on performance, processing characteristics, and parts yields of broiler chickens. *Poultry Sci.* 1990; 69:1787-1791.
13. Krishana L, Swarup D, Patra RC. An overview prospects of ethano-veterinary medicine in India. *Indian J Anim. Sc.* 2005; 75(12):1481-1491.
 14. Miles RD, Butcher GD, Henry PR, Littell RC. Effect of antibiotic growth promoters on broiler performance, intestinal growth parameters, and quantitative morphology. *Poultry Sci.* 2006; 85:476-485.
 15. Narhari D. Performance promoting ability of Active Forte in broilers. *Poult. Advisor.* 1992; 25(7):37-38.
 16. Owens B, Tucker L, Collins MA, McCracken KJ. Effects of different feed additives alone or in combination on broiler performance, gut microflora and ileal histology. *Brit. Poultry Sci.* 2008; 49:202-212.
 17. Pandey GS, Nighantu KCBP. *Chaukhamkha Bharati Academy: Varanasi, India, 1998, 392-393.*
 18. Pedulwar SN, Zanzad AA, Choudhari AJ, Ramteke BN, Deshmukh GB. Effect of dietary supplementation of Shatavari (*Asparagus racemosus*) on broilers. *Indian J Field Veterinarians.* 2007; 3(1):28-29.
 19. Snedecor GW, Cochran WG. *Statistical methods, 8th edn. Oxford and IBH Publishing Co., New Delhi, India, 1994.*
 20. Srivastava SB, Ram Niwas, Singh DP, Bisen B. Impact of herbal based diets on production efficiency of broiler. *The Bioscan.* 2013; 8(1):119-122.