



Effect of Feed Supplementation of Shatavari Root Powder (*Asparagus racemosus*) on Growth Performance of Broiler in Konkan Region

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: <https://doi.org/10.9734/arja/2024/v17i4578>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/125710>

Original Research Article

Received: 20/08/2024

Accepted: 22/10/2024

Published: 02/11/2024

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Cite as: Patil, N. K., N. N. Prasade, D. D. Sawant, A. J. Mayekar, S. S. Ramod, P. B. Bansode, and S. G. Shirsat. 2024. "Effect of Feed Supplementation of Shatavari Root Powder (*Asparagus Racemosus*) on Growth Performance of Broiler in Konkan Region". *Asian Research Journal of Agriculture* 17 (4):714-19. <https://doi.org/10.9734/arja/2024/v17i4578>.

ABSTRACT

The present study aimed to highlight the effect of feed supplementation of Shatavari root powder (*Asparagus racemosus*) on growth performance of broiler in Konkan region. A substantial portion of the production expenses is attributed to the cost of feed and in a developing country like India, the supply of quality and affordable feed has been inconsistent. To enhance the overall productivity of poultry birds, it is imperative to maintain a reliable source of low-cost feed. The experimental trial of six weeks was undertaken for total 200-day old broiler chicks. They were randomly distributed into five experimental diets. Each treatment group was replicated into four with 10 birds per replicate. The control (T₀) group was fed standard ration and T₁, T₂, T₃, and T₄ group were provided same standard ration supplemented with 5.00, 10.00, 15.00 and 20.00 g /kg Shatavari root powder, respectively. Result of experiment showed that supplementation of Shatavari root powder was significantly highest live body weight in treatment T₂ (1852.50 g/bird) as well as average live weight gain (264.64 g/bird). It is concluded that, 10.00 g of Shatavari root powder significantly improved growth performance than other treatments groups.

Keywords: Shatavari root powder; broiler chicks; growth performance.

1. INTRODUCTION

Over the last two decades, the Indian Broiler Industry has experienced remarkable growth, emerging as a highly sought-after and profitable venture for educated unemployed individuals in India. Chicken meat production has seen a significant surge in recent years, primarily due to research and educational initiatives aimed at improving feed intake and growth rates. A substantial portion of the production expenses is attributed to the cost of feed and in a developing country like India, the supply of quality and affordable feed has been inconsistent. To enhance the overall productivity of poultry birds, it is imperative to maintain a reliable source of low-cost feed. Ongoing endeavors are focused on identifying alternative and cost-effective feed ingredients to meet the needs of farmers.

In recent times, researchers have shifted their focus towards utilizing locally available natural feed resources as additives to enhance the performance of broilers. Additionally, the indiscriminate use of antimicrobials and other drugs to boost growth rates can have adverse effects on both the birds' health and the consumers. As a result, poultry scientists are once again turning their attention to our traditional medicinal system to identify beneficial herbs and plants that can be safely incorporated to increase production. The use of herbs and extracts from medicinal plants in poultry nutrition could prove more advantageous as growth promoters and for the prevention of common poultry diseases.

Due to above reasons efforts are being made to identify the potent new feed additives in poultry feeds that do not show adverse effects. As an alternative to, Various additives such as probiotics, prebiotics, antibacterials, antivirals and hepatoprotectives are introduced as a feed supplement to attain rapid development in broilers. Among these Shatavari root powder (*Asparagus racemosus*) has attracted worldwide prominence in recent years. This plant belongs to Liliaceae family, common at low altitudes in shade and in tropical climates throughout India, Asia, Australia and Africa. Shatavari is used in various pharmaceutical formulations due to its nutritional, stress-relieving, adaptogenic, immune-boosting, lactation-promoting, anabolic, and performance-enhancing properties [1,2,3,4,5]. Shatavari has been mentioned in ayurvedic texts like the Charak Samhita, Susruta Samhita and Astanga Samgraha. Shatavari possesses antidiarrhoeal, anti-ulcerative, anti-spasmodic, aphrodisiac, galactagogue and other properties and has therefore gained its importance in Ayurveda, Siddha and Unani systems of medicine [6]. According to recent chemical investigations, Shatavari contains four steroid saponins: Shatavarins 1 to 4. Shatavarin 1 is the major glycoside of sarsasapogenin, the sugar moieties being 3 glucose and 1 rhamnose. Shatavari 4 is structurally related to Shatavarin 1 and contains 2 glucose and 1 rhamnose. Overall Shatavari is a soothing tonic, alternative demulcent, refrigerant. It nourishes and rejuvenates the tissue, promotes vitality and strength. It is bitter, emollient, cooling, nervine, appetizer and astringent. It is used for diseases

of blood and nervous disorders as well as general debility [7].

2. MATERIALS AND METHODS

2.1 Treatments and Experimental Design

The trial was conducted on Total 200, day old broiler chicks, obtained from Isha Poultry services Chiplun, District Ratnagiri. The chicks were from the same hatch and were reared under uniform management condition up to sixth weeks of age. On arrival, the chicks were weighed individually and randomly divided into five treatments including control were formulated. The experiment was conducted in a Randomized Block Design with following dietary treatments. The control (T_0) group was fed standard ration and T_1 , T_2 , T_3 , T_4 group were provided same standard ration supplemented with 5.00 g, 10.00 g 15.00 g and 20.00 g Shatavari root powder, respectively. The experiment was conducted at poultry unit of instructional farm department of Animal Husbandry and Dairy Science, College of Agriculture, Dapoli. District – Ratnagiri, Maharashtra.

2.2 Management Practices

The brooders, waterers and feeders were thoroughly cleaned, washed and disinfected before the arrival of chicks. The experimental birds were reared on deep litter system up to 4 days of age for brooding purpose. The brooding temperature was regulated from 85 to 95°F (26.6 to 35°C). Ten chicks per replication *i.e.*, fourty chicks per treatment were reared and brooded separately on deep litter system up to the age of six weeks.

All the birds during brooding period were fed crumble for the first three days. After that, birds were offered commercial broiler 'starter' crumbles from 4th day to end of 3rd weeks of age followed by broiler 'finisher' crumbles till end of 6th week. The experimental feed was in a powdered form and then supplemented from the start of 4th day to end of 6th week. The birds of different groups were fed separately throughout the experimental period; birds were fed twice a day. The leftover was collected and weighed next day morning. Fresh and clean water was offered *ad libitum* to all the birds. Adequate health cover was provided to all the birds.

2.3 Feed Consumption (g/day)

The daily feed consumption of each group was estimated as difference between the total

quantity of feed offered and quantity of feed left over during 24 hours period. Feed consumption so recorded was added together for seven days of the week and was considered as weekly feed consumption.

2.4 Body Weight (g/week)

Individual body weight of the birds from each group was taken at weekly intervals, starting from the day-old stage. The birds were weighed during morning hours before feeding.

2.5 Body Weight Gain (g/week)

The growth rate of the birds was reflected through the weekly weight gain. The average weekly weight gain of the birds of various groups was calculated by subtracting the previous week average weight of the group of birds from the present week average weight of the group of birds.

3. RESULTS AND DISCUSSION

3.1 Growth Performance

3.1.1 Feed consumption (g/bird)

Throughout the six-week trial, the average feed intake of the broiler chicks was noted at weekly intervals. The average weekly feed consumption of broiler chicks presented in Table 1.

In the present study, the total amount of feed consumed throughout the course of six weeks was 3907.75, 3909.00, 3869.50, 3885.00 and 3878.00 g/bird/week for treatments T_0 , T_1 , T_2 , T_3 and T_4 , respectively. Higher feed intake was noted in T_1 than treatments T_2 , T_3 and T_4 . Treatment T_2 resulted in lower feed consumption than other four treatments this is because of herbs, spices and various plant extracts have appetite and digestion stimulating properties and antimicrobial effects that's why birds fed with Shatavari root powder shows less consumption of feed. In treatments T_0 , T_1 , T_2 , T_3 and T_4 the average weekly feed consumption (g/bird) was 651.29, 651.50, 644.92, 647.50 and 646.33. However, treatments T_0 , T_1 were at par with each other and significantly higher weekly feed consumption than T_2 , T_3 and T_4 . The treatments T_2 , T_3 and T_4 were at par with each other.

The results of the present investigation are slightly similar with the results reported by Saste Ashwini [8] who observed that at the end of sixth week, the mean cumulative feed consumption

per bird among various treatment groups was lower in T₅ (2539.43 g/bird) 1.50 per cent Shatavari and T₄ (2558.70 g/bird) 1.00 per cent Shatavari supplemented group than T₁ (2812.55 g/bird -control) group.

3.2.2 Body weight (g)

Throughout the duration of the trial, the experimental birds were weighed once a week. From birth to six weeks of age, each treatment group weekly live weight measurements were taken and are shown in Table 2. The day-old experimental chicks average starting body weights for the five different treatments T₀, T₁, T₂, T₃ and T₄ were 49.50, 50.25, 49.25, 49.50 and 50.25 g. and an average body weight at the six week was 1717.25, 1780.00, 1852.50, 1813.50 and 1816.25 g., respectively. Up to the first three weeks of the trial, there was no noticeable difference between the treatment groups based on the weekly body weight variations of the chicks. At the end of the six week, the T₂ group had numerically higher body weight than T₀, T₁, T₃ and T₄. So it can be determined that Shatavari, a phytobiotic feed additive had a better effect on body weight gain in broilers.

The findings of present study are lower in accordance with the result of Kumar et al. [9] who observed the higher body weight at the end of 6th week as 1906.64, 1883.33, 1861.05, 1855.99 g/bird for treatment group T₃ (1.00% shatavari root powder), T₂ (0.50% shatavari root powder), T₄ (1.50% shatavari root powder), T₅

(2.00% shatavari root powder) while the control T₁ (1874.48g/bird) group was fed diet without shatavari root powder shows lower body weight.

3.2.3 Body weight gain

The body weight gain of broiler chicks at different weekly intervals on inclusion of Shatavari root powder in feed is presented in Table 3.

The results showed that the day-old chicks in the treatment groups had average initial live weights of 49.50, 50.25, 49.25, 49.50 and 50.25 (g/bird) for T₀, T₁, T₂, T₃ and T₄, respectively. The average weekly body weight gain for each bird was 245.32, 254.28, 264.64, 259.07 and 259.46 g. for T₀, T₁, T₂, T₃ and T₄, respectively. During the first three weeks of the trial, the weekly live body weight gain of chicks showed no standard difference between each of the treatment groups. The most notable weight gain was seen in treatment T₂ during the fifth week. At the end of sixth week, treatment T₂ showed greater body weight gain (410g/bird) which was numerically higher than T₀, T₁, T₃, T₄. The treatments T₂, T₃, T₄ were at par with each another. In week sixth it was observed that decrease in body weight gain as compared to fifth week, the possible reason may be there was a sudden change in climatic condition as the temperature decreases at the start of the monsoon and due to acclimatization of birds to different temperature condition that results in the slightly decrease in body weight gain.

Table 1. Weekly feed consumption (g/bird)

Treatment	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Total	Mean
T ₀	156.75	308.25	494.00	839.00	985.50	1124.25	3907.75	651.29 ^a
T ₁	153.50	309.75	494.25	838.50	984.00	1129.00	3909.00	651.50 ^a
T ₂	154.00	309.50	494.75	828.50	982.00	1100.75	3869.50	644.92 ^b
T ₃	153.25	308.50	491.75	832.75	977.75	1121.00	3885.00	647.50 ^b
T ₄	150.25	309.50	487.00	834.25	975.75	1121.25	3878.00	646.33 ^b
S.E. m	1.34	1.22	1.72	2.37	2.19	5.52	5.04	0.84
CD	NS	NS	5.29	7.32	6.74	17.01	15.52	2.59

Table 2. Weekly live body weight (g/bird)

Treatment	Initial	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Mean
T ₀	49.50	164.75	351.50	651.00	978.75	1364.25	1717.25 ^d	753.85 ^d
T ₁	50.25	168.00	354.50	661.25	999.00	1405.50	1780.00 ^c	774.07 ^c
T ₂	49.25	166.25	353.25	664.50	1003.75	1442.50	1852.50 ^a	789.85 ^a
T ₃	49.50	163.50	355.75	660.75	992.25	1421.00	1813.50 ^{ab}	778.53 ^c
T ₄	50.25	163.25	359.25	669.50	1002.00	1419.25	1816.25 ^{ab}	783.39 ^{ab}
S.E. m	0.82	2.29	1.70	3.98	4.78	8.51	13.05	2.55
C.D.	NS	NS	NS	NS	14.73	26.24	40.22	7.86

Table 3. Weekly live body weight gain (g/bird)

Treatment	Initial	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Mean
T ₀	49.50	115.25	186.75	299.50	327.75	385.50	353.00	245.32 ^d
T ₁	50.25	117.75	186.5	306.75	337.75	406.50	374.50	254.28 ^c
T ₂	49.25	117.00	187.00	311.25	339.25	438.75	410.00	264.64 ^a
T ₃	49.50	114.00	192.25	305.00	331.50	428.75	392.50	259.07 ^{ab}
T ₄	50.25	113.00	196.00	310.25	332.50	417.25	397.00	259.46 ^{ab}
S.E. m	0.82	2.11	2.72	4.14	6.80	11.30	11.76	1.89
C.D.	NS	NS	NS	NS	NS	34.81	36.22	5.81

Similar finding was reported by Verma et al. [10] they reported in weeks 1 and 2, there was no noticeable difference between the body weight gain of the various groups of broiler chicken. The treatment T₂ (1.00% shatavari root powder) group had the highest body weight (2547.76 g/bird) at the end of the sixth week, which was significantly greater than the body weights of the other three groups, T_c (2423.03g/bird) control, T₁ (2442.39g/bird) 0.50 per cent shatavari root powder, T₃ (2273.97g/bird) 1.50 per cent shatavari root powder.

4. CONCLUSION

In comparison to controls and other treatments, it was shown that adding 10.00 g/kg of Shatavari root powder to the feed considerably enhanced growth performance in terms of feed intake, body weight, and body weight gain. Hence, it can be concluded that commercial broiler feed can be successfully added Shatavari root powder up to level of 10.00 g/kg of feed without affecting productive performance of broiler birds that results in good health and better economic returns.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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