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Effect of Shatavari (*Asparagus racemosus*) root powder supplementation on growth performance and haemato- biochemical profile of broiler chickens

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Abstract

The present experiment was conducted to evaluate the effect of dietary supplementation of Shatavari (*Asparagus racemosus*) root powder on growth performance and haemato-biochemical profile of broiler chickens. A total of 240 day-old VenCobb-400 broiler chicks were randomly distributed into four treatment groups with six replicates of ten birds each. The treatments consisted of T₀ (basal diet), T₁ (basal diet + Bacitracin Methylene Disalicylate @ 50 mg/kg feed), T₂ (basal diet + 0.5% Shatavari root powder) and T₃ (basal diet + 1% Shatavari root powder). The feeding trial was conducted for five weeks. Growth performance parameters such as body weight, body weight gain, feed intake and feed conversion ratio were recorded weekly. Blood samples were collected at the end of the experiment to determine haemato-biochemical parameters. Results indicated that dietary supplementation of Shatavari root powder significantly ($P<0.05$) improved body weight gain and feed conversion ratio compared with the control group. Haemoglobin concentration and serum protein levels were also improved in Shatavari supplemented groups. The study suggested that Shatavari root powder may serve as a natural alternative to antibiotic growth promoters in broiler nutrition.

Keywords: Haemoglobin, broiler chicken, growth performance, haemato-biochemical profile, herbal feed additive, Shatavari

1. Introduction

The poultry industry is one of the most rapidly expanding sectors of livestock production and plays a vital role in providing animal protein to the human population. In India, poultry production has increased significantly over the past few decades due to the adoption of improved breeds, scientific management practices and balanced nutrition.

Efficient broiler production primarily depends on faster growth rate, better feed conversion efficiency and high survivability of birds. Feed cost accounts for nearly 60-70% of the total production cost; therefore, improving feed efficiency is an important factor for profitable poultry farming.

For many years, antibiotic growth promoters have been widely used in poultry diets to improve growth rate and feed utilization (Miles *et al.*, 2006; Dibner and Buttin, 2002) [9, 12]. However, continuous use of antibiotics has raised serious concerns regarding antibiotic residues in poultry products and development of antimicrobial resistance in humans. Consequently, the use of antibiotic growth promoters has been banned or restricted in many countries (Alcicek *et al.*, 2004; Owens *et al.*, 2008) [11, 7].

In recent years, phyto-genic feed additives derived from medicinal plants have gained considerable attention as natural alternatives to antibiotic growth promoters. These additives contain bioactive compounds with antimicrobial, antioxidant and digestive stimulant properties that enhance nutrient utilization and overall performance of poultry birds (Kumar *et al.*, 2019) [1].

Shatavari (*Asparagus racemosus*) is a well-known medicinal herb belonging to the family Asparagaceae.

The tuberous roots of Shatavari contain steroidal saponins known as Shatavarins along with flavonoids and antioxidants. These compounds exhibit immunomodulatory, anti-stress and anabolic properties (Kamat *et al.*, 2000) [14]. Earlier studies have reported that supplementation of Shatavari root powder in broiler diets improved growth performance and health status of birds (Rekhate *et al.*, 2004; Pedulwar *et al.*, 2007; Gaikwad *et al.*, 2015) [10, 8, 2].

In addition to growth performance, herbal feed additives may influence haematological and biochemical parameters, which reflect the physiological and metabolic status of animals. Rekhate *et al.* (2010) [5] and Kant *et al.* (2014) [4] reported improved haematological parameters in broilers supplemented with Shatavari.

Considering these aspects, the present study was undertaken to evaluate the effect of Shatavari (*Asparagus racemosus*) root powder supplementation on growth performance and haemato-biochemical profile of broiler chickens.

Materials and Methods

Experimental birds and design

The experiment was conducted at the Poultry Unit of the Department of Animal Nutrition, College of Veterinary Sciences and Animal Husbandry, Mhow. A total of 240 day-old VenCobb-400 broiler chicks were randomly allotted to four dietary treatments with six replicates of ten birds each.

Table 1: Experimental treatments

Treatment	Diet description
T ₀	Basal diet (control)
T ₁	Basal diet + Bacitracin Methylene Disalicylate @ 50 mg/kg feed
T ₂	Basal diet + 0.5% Shatavari root powder
T ₃	Basal diet + 1% Shatavari root powder

The feeding trial was conducted for five weeks

Feeding and management

Birds were reared under standard management conditions. Feed and water were provided ad libitum throughout the experimental period. The experimental diets were formulated according to BIS (2007) nutrient specifications for broilers. The feeding program consisted of three phases:

- Pre-starter diet (0-7 days)
- Starter diet (8-21 days)
- Finisher diet (22-35 days)

Routine vaccination schedule was followed for Newcastle disease and Gumboro disease.

Growth Performance

Growth performance parameters such as body weight, body weight gain, feed intake and feed conversion ratio were recorded during the experimental period.

Body weight

Individual body weight of birds was recorded at the beginning of the experiment and subsequently at weekly intervals using a digital weighing balance.

Body weight gain

Weekly body weight gain was calculated by subtracting body weight of the previous week from the body weight recorded at the end of the respective week.

Feed intake: Feed intake was calculated by subtracting the

leftover feed from the total feed offered to each replicate.

Feed conversion ratio

Feed conversion ratio was calculated as:

Feed Conversion Ratio = Feed intake / Body weight gain

Table 2: Effect of Shatavari root powder supplementation on growth performance of broilers (Mean ± SE)

Parameter	T ₀	T ₁	T ₂	T ₃
Final body weight (g)	2050 ±35 ^c	2105 ±30 ^b	2178 ±32 ^{ab}	2235 ±28 ^a
Body weight gain (g)	2000 ±34 ^c	2055 ±28 ^b	2128 ±35 ^{ab}	2185±27 ^a
Feed intake (g)	3850 ±45	3805 ±42	3760 ±40	3725 ±39
Feed conversion ratio	1.92±0.03 ^a	1.85±0.03	1.77±0.03	1.70±0.03

Means bearing different superscripts within a row differ significantly ($P<0.05$)

Haemato-Biochemical Parameters

Blood samples were collected at the end of the experimental period for hematological and biochemical analysis.

Hematological parameters

The following hematological parameters were estimated using standard laboratory procedures:

1. Hemoglobin (Hb)
2. Packed cell volume (PCV)
3. Total erythrocyte count (TEC)

Serum biochemical parameters

Serum samples were analyzed for:

1. Total protein
2. Albumin
3. Globulin
4. Blood glucose
5. Total cholesterol
6. Triglycerides

Albumin-globulin ratio was calculated from albumin and globulin values.

Table 3: Effect of Shatavari supplementation on haemato-biochemical parameters of broilers (Mean ± SE)

Parameter	T ₀	T ₁	T ₂	T ₃
Hemoglobin (g/dl)	9.8 ±0.20 ^c	10.3±0.18 ^b	11.2 ±0.16 ^{ab}	11.8 ±0.15 ^a
PCV (%)	30.2 ±0.50 ^c	32.4±0.45 ^b	34.8 ±0.40 ^{ab}	36.5±0.38 ^a
TEC (million/mm ³)	2.40±0.05	2.48±0.06	2.55±0.05	2.60±0.04
Total protein (g/dl)	4.8±0.10 ^c	5.1±0.11 ^b	5.4±0.09 ^{ab}	5.6±0.08 ^a
Glucose (mg/dl)	210±3	205±4	198±3	195±3
Cholesterol (mg/dl)	152±4 ^a	148±3 ^a	140±3 ^b	136±2 ^b

Means bearing different superscripts within a row differ significantly ($P<0.05$).

Results and Discussion

Dietary supplementation of Shatavari root powder improved growth performance of broiler chickens. Birds fed Shatavari supplemented diets exhibited higher body weight gain and lower feed conversion ratio (FCR) efficiency compared to the control group. This improvement may be attributed to the presence of steroidal saponins and other bioactive compounds that stimulate digestion and nutrient absorption.

These results are in agreement with the findings of Sundaramanna and Seshadri (1986), Rekhate *et al.* (2004) [10] and Pedulwar *et al.* (2007) [8], who reported improved growth performance in broilers supplemented with Shatavari root powder. Gaikwad *et al.* (2015) [2] also reported higher body weight in broilers receiving 1 percent Shatavari

supplementation.

The haemato-biochemical parameters were also positively influenced by Shatavari supplementation. Haemoglobin concentration and total protein levels were higher in the supplemented groups compared to the control group, indicating improved physiological and metabolic status of birds.

Similar findings were reported by Rekhate *et al.* (2010) [5], who observed higher haemoglobin and serum protein levels in broilers supplemented with Shatavari root powder. Kant *et al.* (2014) [4] also reported improved haematological parameters in broilers fed herbal supplemented diets.

Conclusion

The present study revealed that Dietary supplementation of Shatavari root powder at 0.5% and 1.0% significantly improved body weight gain, feed conversion ratio, and haemato-biochemical parameters of broiler chickens. Therefore, Shatavari root powder may be recommended as a natural alternative to antibiotic growth promoters in broiler nutrition.

Conflict of Interest

Not available.

Financial Support

Not available.

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