



ISSN: 2456-2912

VET 2024; SP-9(3): 282-285

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Received: 15-03-2024

Accepted: 14-04-2024

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## Effect of Tulsi leaf powder (*Ocimum sanctum*) as feed additives on growth performance of broilers

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### Abstract

An experiment was carried out at the Poultry unit, Veterinary Polyclinic and Artificial Insemination Center, Department of Animal Husbandry and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra, India during the year 2022-23. In all, 120 day-old chicks were selected for the experiment. The chicks fed with basal diet in control group (T<sub>0</sub>), while chicks in treatment T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were fed basal diet with tulsi leaf powder @ 1.0, 1.50 and 2.0 per cent each, respectively. The weekly body weight changes of chicks indicated non-significant difference among various treatment groups during first two weeks of the experiment. Whereas, significant difference among the treatments were observed from third week onwards. It was observed that average live body weight of the chicken at the end of 6th week was 1990.18, 2038.42, 2171.99 g and 2078.18 g, respectively. The cumulative feed intake of chicks indicated non-significant difference among various treatment groups during first two weeks of the experiment. However, significant differences among the various treatment groups were reported from third week onwards. The feed conversion ratio in sixth week for different treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 1.88, 1.91, 1.84 and 1.96, respectively. Statistically better FCR was recorded in T<sub>2</sub> treatment as compared to other treatments.

**Keywords:** Tulsi leaf, growth performance, body weight gain

### Introduction

Indian Poultry Industry is facing prominent problems of immunosuppression due to various factors *viz.*, management conditions, nutritional status, intensive production system, high density rearing and infectious diseases. Hence, it is priority to find ways and techniques for enhancement of immune response by nutritional manipulation. Qualitative and Quantitative information is available in literature to administrate vitamins, minerals, amino acids and their different combinations for chicken to enhance their performance. Since the use of antibiotics has been limited, better use of supplementary immuno-stimulatory nutrients has to be made available in poultry feeding (Mode *et al.*, 2009)<sup>[5]</sup>.

Nowadays, increased consumer awareness for safe poultry products lead customers to approach “stable to table” giving preference to healthy animal products. One of the feed additives used to increase the performance of poultry are natural herbs. Herbs are the dried leaves of aromatic and medicinal plants. Studies on plant-based alternatives increased after restricted use of antibiotics to increase growth in Poultry Industry. There are numerous feed additives of plant origin such as Amla, Tulsi, Cinnamon, Shatavari, Basal, Garlic, etc. (Salman, 2019)<sup>[8]</sup> that are used in broiler feeds as to improve the performance by enhancing growth rate, better feed conversion efficiency and lower mortality. Recently the use of antibiotics as feed additives is contraindicated due to health concern about their residues in animal tissues and the production of drug resistant bacteria (Zomrawi *et al.*, 2012)<sup>[10]</sup>.

### Methodology

In the present study, day old broiler chicks (n-120) Ven Cobb 400 were procured from the Venky's hatcheries private limited, Pune, Maharashtra. On arrival, chicks were distributed on equal weight basis into four treatment groups *viz.*, T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> with 30 chicks in each treatment as replicates. The chicks were reared for 42 days. They were housed in separate compartments. Chicks were fed experimental diet with different level of Tulsi leaf powder

during the experimental period of six weeks of age. Treatment details are as under-

T <sub>0</sub>	Basal diet (control)
T <sub>1</sub>	Basal diet + 1.00% Tulsi leaf powder
T <sub>2</sub>	Basal diet + 1.50% Tulsi leaf powder
T <sub>3</sub>	Basal diet + 2.0% Tulsi leaf powder

**Observations recorded**

**Body weight of chicks**

Chicks of all the groups were weighed at weekly intervals using electronic balance.

**Feed consumption**

Daily feed consumption was recorded for each group.

**Feed Conversion Ratio (FCR)**

Feed Conversion Ratio was calculated at weekly interval with the help of body weight gain and feed consumption during that particular week.

**Body weight gain of chicks**

Body weight gain of chicks at different weeks was obtained by subtracting the body weight of chicks of previous weeks.

**Results and Discussion**

**Cumulative body weight**

The body weight changes of broiler chicks at different weekly intervals on inclusion of Tulsi leaf powder in feed has been

represented in Table 1. The average initial body weight of day old experimental chicks in different treatments i.e. T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups were found as 45.95, 44.45, 45.13 and 44.18 gm, respectively. The average final body weight of experimental chicks at 6<sup>th</sup> week of age was 1990.18, 2038.42, 2171.99 and 2078.18 gm in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups respectively. The weekly body weight changes of chicks indicated no significant difference among various treatment groups during the first two weeks of the experiment were the significant difference among the various treatment groups was reported from third weeks onwards. At the end of the sixth week, significantly (P<0.05%) higher body weight gain found in T<sub>2</sub> followed by T<sub>3</sub>, T<sub>1</sub> and lower in T<sub>0</sub> control group was recorded.

The reason for the advanced weight gain in T<sub>2</sub> and T<sub>3</sub> probably due to adaptogenic, antimicrobial, immunomodulator, antistress properties in tulsi leaf powder and better digestion of nutrients due to tulsi leaf powder. Results recorded by some of research workers as discussed below agree with present results, Mode *et al.* (2009) [5] found on feeding herbal immune modulator containing *Ocimum sanctum* and *Embllica officinalis* @ 3 g/kg for two weeks had significantly increased body weight and body weight gain of broiler birds. As well as Rabia (2010) [7] and Swathi *et al.* (2012) [9] found that the body weight gain (g) was numerically higher in supplemented groups as compared to the control group.

**Table 1:** Cumulative body weight changes of broilers (gm/bird) in response to Tulsi leaf powder supplementation

Weeks	Treatments				Mean (±) SE	CD @ 5%
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
Initial	45.95	44.45	45.13	44.18	44.92±0.46	NS
First	195.93	197.63	199.13	198.75	197.86±1.46	NS
Second	409.03	411.78	414.18	413.88	412.21±3.86	NS
Third	693.13 <sup>b</sup>	701.55 <sup>b</sup>	742.14 <sup>a</sup>	733.48 <sup>a</sup>	717.57±5.02	14.01
Fourth	1089.08 <sup>d</sup>	1121.7 <sup>c</sup>	1184.09 <sup>a</sup>	1156.15 <sup>b</sup>	1137.75±8.08	22.58
Fifth	1526.08 <sup>d</sup>	1565.33 <sup>c</sup>	1644.78 <sup>a</sup>	1604.93 <sup>b</sup>	1585.28±13.41	37.46
Six	1990.18 <sup>cd</sup>	2038.42 <sup>c</sup>	2171.99 <sup>a</sup>	2078.18 <sup>b</sup>	2069.69±21.52	60.13

**Body Weight Gain**

Data pertaining average body weight gain of the experimental birds under different dietary treatments are presented in Table 2. The weekly live body weight gain of chicks indicated non significant difference among various treatment groups during the first two weeks of the experiment. There is significant (P<0.05) difference among the treatments from third weeks onwards. In the sixth week, significantly (P<0.05%) higher body weight gain in the T<sub>2</sub> (527.21 g) were T<sub>1</sub> and T<sub>3</sub> at par to each other and lower weight gain in T<sub>0</sub> (control group) was recorded.

**Table 2:** Weekly live body weight gain of broilers (gm/bird) fed with Tulsi leaf powder

Weeks	Treatments				Mean (±) SE	CD @ 5%
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
First	150.00	153.18	154.00	154.57	152.93±1.48	NS
Second	213.00	214.15	215.05	215.13	214.33±1.62	NS
Third	284.10 <sup>b</sup>	289.77 <sup>b</sup>	327.96 <sup>a</sup>	319.60 <sup>a</sup>	305.35±5.34	14.92
Fourth	396.32 <sup>b</sup>	420.15 <sup>a</sup>	441.95 <sup>a</sup>	422.67 <sup>a</sup>	420.27±8.56	23.93
Fifth	436.63 <sup>b</sup>	443.63 <sup>ab</sup>	460.69 <sup>a</sup>	448.78 <sup>a</sup>	447.43±11.57	32.33
Six	464.78 <sup>c</sup>	473.09 <sup>b</sup>	527.21 <sup>a</sup>	473.25 <sup>b</sup>	484.58±18.74	52.35

broiler chicks represented in Table 3. The overall average feed intake of the birds during experiment for the treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 3547.61, 3617.34, 3737.51 and 3695.43 gm respectively. Treatment T<sub>2</sub> (3617.34 g/bird) and T<sub>3</sub> (3695.43 g/bird) were at par to each other. The cumulative feed intake of chicks indicated non-significant difference among various treatment groups during the first three weeks of the experiment. However, significant (P<0.05) differences among the various treatment groups were reported from fourth week onwards. The increased feed intake of the tulsi leaf powder fed broilers in this experiment was quite understandable. Tulsi leaf powder contained anti-inflammatory properties which tend to increase total nutrient uptake and absorption content in the feed. The better feed taste and faster nutrient utilization of tulsi improved palatability, appetite and digestion of birds.

Results recorded by some of research workers as discussed below agree with present results Abaza (2007) [11] showed that supplementation of diet with the medicinal plants increased numerically egg number than those fed control diet, at the same time significantly decreased feed consumption and improved feed conversion. As well as Lanjewar *et al.* (2008) [4] found similar results.

**Cumulative Feed Intake:** The average weekly feed intake of

**Table 3:** Cumulative average feed intake (g/bird) of broilers

Weeks	Treatments				Mean ( $\pm$ ) SE	CD @ 5%
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
First	174.00	174.33	175.03	175.03	174.59 $\pm$ 1.04	NS
Second	551.25	550.38	552.51	551.21	551.33 $\pm$ 4.35	NS
Third	1113.4 <sup>c</sup>	1150.41 <sup>b</sup>	1115.67 <sup>c</sup>	1174.43 <sup>a</sup>	1138.47 $\pm$ 7.63	21.16
Fourth	1873.87 <sup>c</sup>	1920.41 <sup>b</sup>	1965.85 <sup>a</sup>	1969.04 <sup>a</sup>	1932.29 $\pm$ 10.25	30.52
Fifth	2672.40 <sup>c</sup>	2715.24 <sup>b</sup>	2767.45 <sup>a</sup>	2767.86 <sup>a</sup>	2730.73 $\pm$ 15.59	44.83
Six	3547.61 <sup>c</sup>	3617.34 <sup>b</sup>	3737.51 <sup>a</sup>	3695.43 <sup>a</sup>	3649.47 $\pm$ 20.94	61.34

### Weekly Feed Intake

The average weekly feed intake of broiler chicks represented in Table 4. The average feed intake of the birds at first week of age during experiment for treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 174.17, 174.133, 175.03 and 175.03g respectively. The average feed intake of the birds at six weeks of age during experiment for treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 875.21, 902.10, 970.06 and 927.57gm, respectively. At the end of the sixth week, significantly (P<0.05%) higher Weekly feed intake (g/b) of broilers gain found in T<sub>2</sub> followed by T<sub>3</sub>, T<sub>1</sub> and lower in T<sub>0</sub> control group was recorded. Whereas Kafi *et al.* (2017)<sup>[2]</sup> are in agreement with present results.

**Table 4:** Weekly feed intake (g/b) of broilers

Weeks	Treatments				Mean ( $\pm$ ) SE	CD @ 5%
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
First	174.17	174.33	175.03	175.03	174.64 $\pm$ 2.01	NS
Second	377.25	376.05	377.08	376.18	376.64 $\pm$ 3.50	NS
Third	562.15 <sup>c</sup>	600.03 <sup>b</sup>	600.16 <sup>b</sup>	623.22 <sup>a</sup>	596.39 $\pm$ 6.05	18.22
Fourth	760.47 <sup>b</sup>	769.83 <sup>b</sup>	813.18 <sup>a</sup>	794.61 <sup>a</sup>	784.52 $\pm$ 7.88	21.92
Fifth	798.53	795.00	801.60	798.82	798.48 $\pm$ 16.12	NS
Six	875.21 <sup>b</sup>	902.10 <sup>b</sup>	938.06 <sup>a</sup>	927.57 <sup>a</sup>	918.73 $\pm$ 21.49	29.43

### Feed Conversion Ratio

Data pertaining to feed conversion ratio of the experimental

birds under different dietary treatments are presented in Table 5. The overall average feed Conversion Ratio of the birds during experiment for the treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 1.88, 1.91, 1.84 and 1.96 gm, respectively. At the end of the sixth week, significantly (P<0.05%) higher Weekly feed Conversion Ratio (g/b) of broilers gain found in T<sub>2</sub> followed by T<sub>3</sub>, T<sub>1</sub> and lower in T<sub>0</sub> control group was recorded. Feed conversion ratio during 0-14 days of the experiment does not differ significantly in tulsi leaf powder supplemented group as compared to control. The feed conversion ratio at third week onwards showing the significant effect were at sixth week lower FCR found in T<sub>2</sub> (1.5 percent tulsi leaf powder) which is better than the control group.

The results showed that *Ocimum sanctum* had capacity of improving efficiency of feed utilization level. The efficient utilization of feed resulted in the highest body weight gain in broilers. Results recorded by some of research workers as discussed below are in agreement with present results, Patankar (2009)<sup>[6]</sup> fed T<sub>0</sub> (control), T<sub>1</sub> group (Amla fruit powder @ 0.5%), T (Shatawari root powder @ 0.5%), and T (Tulsi leaf powder @ 0.5%) groups and reported significantly lower feed consumption in TLP supplemented group with non-significant effect in FCR in the supplemented group. Also similar findings were given by Khan *et al.* (2009)<sup>[3]</sup>.

**Table 5:** Weekly feed conversion ratio of broilers

Weeks	Treatments				Mean ( $\pm$ ) SE	CD @ 5%
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
First	1.16	1.14	1.14	1.13	1.14 $\pm$ 0.02	NS
Second	1.77	1.76	1.75	1.75	1.76 $\pm$ 0.04	NS
Third	1.98 <sup>b</sup>	2.07 <sup>a</sup>	1.83 <sup>d</sup>	1.95 <sup>c</sup>	1.96 $\pm$ 0.03	0.09
Fourth	1.92 <sup>a</sup>	1.83 <sup>d</sup>	1.84 <sup>c</sup>	1.88 <sup>b</sup>	1.87 $\pm$ 0.05	0.13
Fifth	1.83 <sup>a</sup>	1.79 <sup>b</sup>	1.74 <sup>d</sup>	1.78 <sup>c</sup>	1.79 $\pm$ 0.07	0.20
Six	1.88 <sup>c</sup>	1.91 <sup>b</sup>	1.84 <sup>d</sup>	1.96 <sup>a</sup>	1.90 $\pm$ 0.06	0.17

### Conclusion

The effect of feeding of Tulsi leaf powder on growth performance of broiler chicken indicated that T<sub>2</sub> had significantly higher body weight and weekly body weight gain as compared to other treatments and the better feed conversion ratio was observed in T<sub>2</sub> (1.84%), as compared to treatment T<sub>0</sub> (1.88%), T<sub>1</sub> (1.91%) and T<sub>3</sub> (1.96%).

### Conflict of Interest

Not available

### Financial Support

Not available

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**How to Cite This Article**

Shaikh F, Kandalkar YB, Borkar VD, Tanpure MU, Dhage SA. Effect of Tulsi leaf powder (*Ocimum sanctum*) as feed additives on growth performance of broilers. *International Journal of Veterinary Sciences and Animal Husbandry.* 2024; SP-9(3): 282-285.

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