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EFFECTS OF INDIGENOUS MEDICINAL PLANT TULSI (*Ocimum sanctum*) LEAVES EXTRACT AS A GROWTH PROMOTER IN BROILER

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The study was conducted to determine the efficacy of Tulsi (*Ocimum sanctum*) leaves extract as a growth promoter in broiler. Thirty (30) day-old broiler chicks were purchased from Kazi hatchery and after seven days of acclimatization in the poultry shed of Pharmacology department randomly divided into two groups I₀ and I₁. No vaccination schedule was practiced and no antibiotics were added in rations. Group was supplemented with Tulsi (*Ocimum sanctum*) leaves extract @ 2ml/litre in drinking water. Weekly observations were recorded for live body weight gain upto 5th weeks and blood test was performed at 17th and 35th day's age of broiler to observe the hematological changes between control (Group) and treatment (Group) group. The treatment group (Group A) recorded statistically non-significant for live body weight at 1st and 2nd weeks than that of control group (Group B) but found statistically significant at 3rd (p<0.01), 4th (P<0.05) and 5th (P<0.01) weeks of age and the Hematological parameters (TEC, PCV, Hb and ESR) showed statistically significant (p<0.01) difference as compared to control group.

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INTRUDUCTION

The poultry industry has become an important economic activity in many countries. In large-scale rearing facilities, where poultry are exposed to stressful conditions, problems related to diseases and deterioration of environmental conditions often occur and result in serious economic losses. Prevention and control of diseases have led during recent decades to a substantial increase in the use of veterinary medicines. However, the utility of antimicrobial agents as a preventive measure has been questioned, given extensive documentation of the evolution of antimicrobial resistance among pathogenic bacteria (Ladefoed et al, 1996). So, the possibility of antibiotics ceasing to be used as growth stimulants for poultry and the concern about the side-effects of their use as therapeutic agents has produced a climate in which both consumer and manufacturer are looking for alternatives (Trafalska and Grzybowska, 2004; Griggs and Jacob, 2005, Nava et al., 2005, Shivakumar et al.,2005, Maity et al,2004)). Essentially, there are two main ways in which we can reduce our dependence on antibiotic use in poultry feed. An obvious choice is the development of alternatives to antibiotics that work via similar mechanisms, promoting growth whilst enhancing the efficiency of feed conversion.

The genus *Ocimum*, typically contain fragrant herbs and small herbs. It has nearly 30 species which are mainly found in the tropics and subtropics (Paton, 1992). Several medicinal properties have been attributed to *Ocimum sanctum* L. Different parts of Tulsi plant e.g. leaves, flowers, stem, root, seeds etc. are known to possess therapeutic potentials and have been used, by traditional medical practitioners, as expectorant, analgesic, anticancer, antiasthmatic, antiemetic, diaphoretic, antidiabetic, antifertility, hepatoprotective, hypotensive, hypolipidemic and antistress agents. Its leaves contain a bright yellow volatile oil. The oil contain eugenol, eugenal, methyl chavicol, limatrol and Caryophylline and a number of sesquiterpenes and monoterpenes viz., barnyl acetate, B-elemense, methylogenol, neral, B-pinene, comphene, A-pinene etc (Jansen, 1981). Tulsi has also been used in treatment of fever, bronchitis, arthritis and convulsions (Afolabi et al,2007, Dermi et al, 2003, Gupta et al, 2007, Saksena et al, 1987, Singh et al, 2002, Surender singh et al, 2003) In modern animal feed formulation many Antimicrobial Growth Promoters (AGP) is being used. But due to the prohibition of most of AGP, plant extracts have gained interest in animal feed strategies (Charis, 2000). The risks of the presence of antibiotic residues in milk and meat and their harmful effects on human health have led to their prohibition for use in animal feed in the European Union. This research work was therefore, designed to study the efficacy of tulsi (*Ocimum sanctum*) leave extract as a growth promoter and its safety evaluation in broilers.

MATERIALS AND METHODS

The experiment was conducted at the Department of Pharmacology, Bangladesh Agricultural University, Mymensingh. Collection and processing of plant material Tulsi (*Ocimum sanctum*) leaves were selected to determine its efficacy as growth promoter on broilers. Mature and disease free Tulsi (*Ocimum sanctum*) leaves were collected from Bangladesh Agricultural University campus.

Preparation of tulsi fresh juice

After washing, the fresh leaves were cut into small pieces by scissors and water was added at 1:10 ratio. Then juice were prepared by blending the leaves with pestle and motor and stored in a refrigerator at 4°C to maintain the active ingredients of juice.

Collection and management of broilers

At first the experimental poultry shed of Pharmacology Department for rearing broiler chicks was properly prepared i.e., the floor and compartment of cages and other surroundings of the shed were cleaned with disinfectant. Day old broiler chicks, 30 (thirty) in number were brought in the experimental shed. Immediately after unloading from the chick boxes the chicks were supplied with Vitamin-C and glucose to prevent the stress occurring during transport. The broiler chicks were kept in the same compartment for 7 days and brooding temperature were maintained accordingly. The litter management was also done very carefully. The starter and finisher broiler rations were supplied to the broiler chicks appropriately.

Experimental design

After 7 days all the 30 broiler chicks were divided into 2 groups (Group A and Group B) for assessing the efficacy of Tulsi (*Ocimum sanctum*) leaves extract as growth promoter on broiler. Chicks of Group B, were kept as control and was not treated. Chicks of Group A, were treated with Tulsi leaves extract (1%) through drinking water @ 2ml/litre for four weeks. All the chicks of treated and control groups were closely observed for 35 days after treatment and following parameters were studied.

Clinical examination

The effect of the Tulsi (*Ocimum sanctum*) leaves extract on body weight of broilers were recorded before and after treatment. Broiler chicks of control and treatment groups were weighed with spring weighing machine. The weight of broiler chicks were taken weekly. The average of these weight was calculated and recorded. Mean live weight gain of each group of chicks on 7th, 14th, 21th, 28th, and 35th days were recorded.

Hematological parameters

Blood samples were collected from wing vein of Broiler of both control and treated groups at 17th and 35th days to study the effect of the Tulsi (*Ocimum sanctum*) leaves extract and the following parameters were observed: (a) Total erythrocyte count (TEC), (b) Hemoglobin estimation (Hb), (c) Packed cell volume (PCV), and (d) Erythrocyte sedimentation rate (ESR) by using well known methods as described by Lamberg and Rothstein (1977).

Post-mortem examination

Five broilers from each group were slaughtered to observe if there were any pathological changes present on 35th day after treatment. There was no significant pathological changes found in any internal organs of the broilers of treatment group.

Statistical analysis

The data were analyzed statistically between control and treated groups of broiler by the well know student's t test.

RESULTS AND DISCUSSION

The observations for live body weight (gm) means of control group(Group B) for 1st, 2nd, 3rd, 4th and 5th weeks of the experimental period were 217gm, 470gm, 850gm, 1320gm and 1780gm ,respectively and treatment group (Group A) were 220gm, 540gm, 980gm, 1480gm and 2220gm, respectively. It is observed from the results of Table 1, that supplementation of tulsi leaves extract in Group A of broilers at 3rd, 4th and 5th weeks effected significant ($P < 0.012$, $P < 0.049$ and $P < 0.014$ respectively) increase in mean live body weights as compared to Control group (Group B). The treatment group of broilers showed statistically higher body weight gain as compared to control group.

Observation of hematological parameters (TEC, Hb, PCV, ESR) on 17th day and 35th day showed significant difference ($P < 0.01$) between the control and Tulsi leaves extract treated groups (Table 2). Observation of birds also revealed low mortality rate among the birds without any vaccination program and also without any antibiotic as growth promoter. The effect of administration of Tulsi leaves extract on TEC was determined on the 17th and 35th day after treatment. The values are shown in Table 2. The administration of Tulsi leaves extract with drinking water increased significantly the number of erythrocytes of chickens in Group A. The highest number of cells was recorded on 35th day after application of extract.

Table 1. Effect of Tulsi (*Ocimum sanctum*) leaves extract on body weight in broiler

	Body weight (gm)		Standard error	P-value	Significance value
	Control	Tulsi			
1	217.00	220.00	1.38	0.330	NS
2	470.00	540.00	20.53	0.078	NS
3	850.00	980.00	31.16	0.012	S
4	1320.00	1480.00	44.05	0.049	S
5	1780.00	2020.00	59.63	0.014	S

S=Significant, NS=Non-significant

Table 2. Effect of Tulsi (*Ocimum sanctum*) leaves extract on hematological parameters of broilers

Age of birds	Parameters	Treatment	Mean	Standard error	P-value	Significance value
17 th day	TEC	Tulsi	211.67	5.859	0.048	S
		Control	192.33	3.67		
	Hb	Tulsi	6.47	0.040	0.007	S
		Control	6.00	0.086		
	PCV	Tulsi	18.33	0.191	0.008	S
		Control	17.33	0.085		
ESR	Tulsi	7.33	0.315	0.0019	S	
	Control	10.67	0.336			
35 th day	TEC	Tulsi	275.33	9.03	0.013	S
		Control	247.67	6.553		
	Hb	Tulsi	7.47	0.0889	0.034	S
		Control	6.93	0.146		
	PCV	Tulsi	19.00	0.153	0.007	S
		Control	18.00	0.126		
ESR	Tulsi	6.00	0.289	0.037	S	
	Control	7.00	0.153			

Hematological parameters (TEC, Hb, PCV & ESR) on 17th day and 35th day showed significant difference ($P < 0.01$) between the control and Tulsi leaves extract

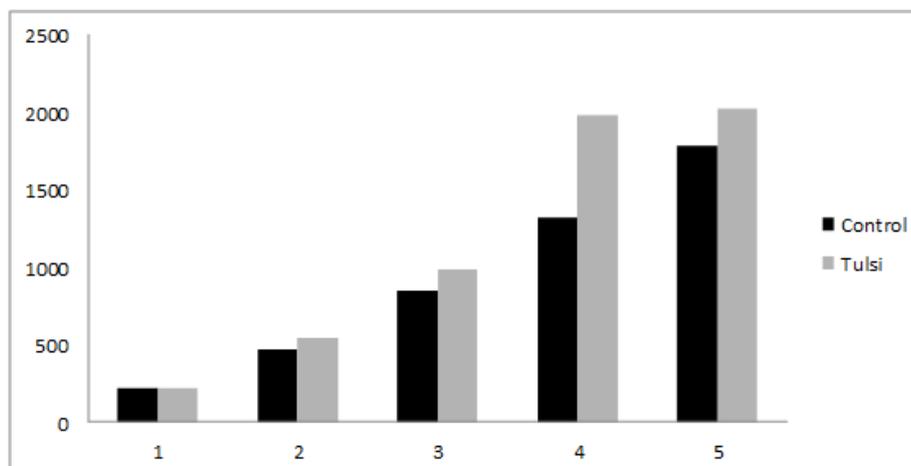


Figure 1. Effect of Tulsi (*Ocimum sanctum*) leaves extract on body weight in broilers

From the findings of the present study, it can be concluded that supplementation of Tulsi (*Ocimum sanctum*) leaves extract @ 2ml/liter drinking water of broiler cause significant increase in live body weight and significant change in hematological parameters. Thus Tulsi leaves extract supplementation in the broiler ration may be useful for the safe, economical and efficient production of broiler and this formulation can be used as an alternative to antibiotic growth promoter.

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