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

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### ARTICLE INFO ABSTRACT

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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 I<sub>0</sub> and I<sub>1</sub>. 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 5<sup>th</sup> weeks and blood test was performed at 17<sup>th</sup> and 35<sup>th</sup> 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 1<sup>st</sup> and 2<sup>nd</sup> weeks than that of control group (Group B) but found statistically significant at 3<sup>rd</sup> (p<0.01), 4<sup>th</sup> (P<0.05) and 5<sup>th</sup> (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, methylengenol, 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 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>th</sup>, 28<sup>th</sup>, and 35<sup>th</sup> days were recorded.

### Hematological parameters

Blood samples were collected from wing vein of Broiler of both control and treated groups at 17<sup>th</sup> and 35<sup>th</sup> 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 35<sup>th</sup> 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 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> 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 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> 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 17<sup>th</sup> day and 35<sup>th</sup> 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 17<sup>th</sup> and 35<sup>th</sup> 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 35<sup>th</sup> 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 <sup>th</sup> 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 <sup>th</sup> 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 17<sup>th</sup> day and 35<sup>th</sup> day showed significant difference ( $P < 0.01$ ) between the control and Tulsi leaves extract

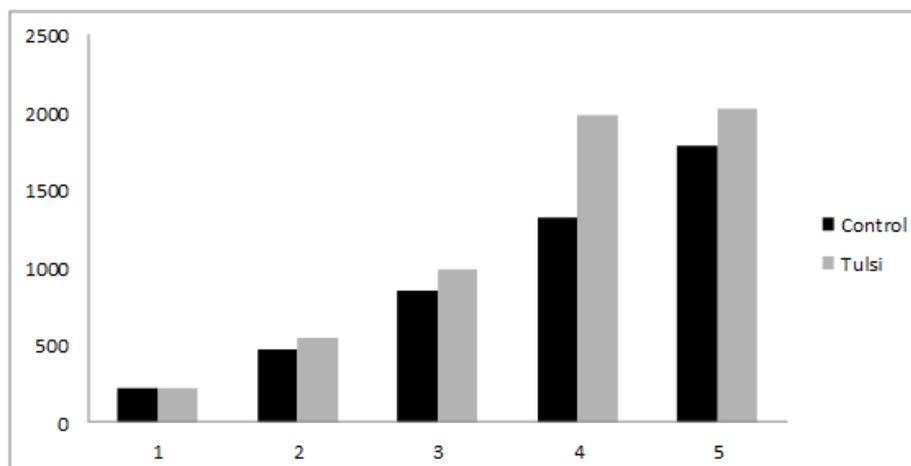


Figure 1. Effect of Tulsi (*Ocimum sanctum*) leaves extract on body weight in broilers

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.

## REFERENCES

1. Afolabi C, EO Akinmoladun , I Ibukun , A Emmanuel , EM Obuotor and EO Farombi, 2007. Phytochemical constituent and antioxidant activity of extract from the leaves of *Ocimum gratissimum*. Scientific Research and Essay. 2: 163-166.
2. Booth NH and LE McDonald, 1986. Veterinary Pharmacology and Therapeutics, 6th Edition, Iowa State University Press, Ames, Iowa.
3. Catala-Gregori P, S Mallet , A Travel , J Orengo and M Lessire, 2008. Efficiency of a prebiotic and a plant extract alone or in combination on broiler performance and intestinal physiology. Canadian Journal of Animal Science, 88: 623-629.
4. Charis K, 2000. A novel look at a classical approach of plant extracts. Feed mix (Special issue on nutraceuticals), 19-21.
5. Demir E, S Sarica, MA Ozcan and M Suicmez, 2003. The use of natural feed additives as alternatives for an antibiotic growth promoter in broiler diets. British Poultry Science. 44: 44- 45.
6. Griggs JP and JP Jacob, 2005. Alternatives to antibiotics for organic poultry production. Journal of Applied Poultry Research, 14: 750–756.
7. Gupta G and S Charan, 2007. Exploring the potentials of *Ocimum sanctum* (Shyama tulsi) as a feed supplement for its growth promoter activity in broiler chickens. Indian Journal of Poultry Science, 42: 140-143.
8. Hernandez F, J Madrid, V Garcia, J Orengo and MD Megias, 2004. Influence of two plant extracts on broiler performance, digestibility, and digestive organ size. Poultry Science, 83: 169-174.
9. Jansen PCM, 1981. Species, condiments and medicinal Plants in Ethiopia, their Taxonomy and Agricultural significance: 85-86.
10. Khan AJ, 1975. Misuse of antibiotics. In: Cento Seminar on Use & Misuse of Antimicrobial Drugs.
11. Ladefoged O, 1996. Drug residues in food of animal origin and related human hazards. In: Proc. Int. Workshop on Rational Applications of Vet. Pharmaceuticals and Biologicals. Balochistan Livestock Development Project, L & DD, Government of Balochistan, Quetta. March 1–3, 1996. pp. 246–253.

12. Lamberg S L and R Rothstein, 1977. Laboratory Manual of Hematology and Urinalysis. AVI. Publishing Company, Inc, West port Connecticut, U.S.A.
13. Maity TK, SC Mandal and M Pal, 2004. Assessment of antitussive activity of *Ocimum sanctum* root extract. Indian Journal of Natural Products, 20: 9-13.
14. Nava GM, LR Bielke, TR Callaway and MP Castañed, 2005. Probiotic alternatives to reduce gastrointestinal infections: The poultry experience. Animal Health Research Review, 6: 105–118.
15. Paton A (1992). A Synopsis of *Ocimum* (labiate) in Africa Kew Bull. 47:403-436.
16. Prescott J F and JD Baggot, 1993. Antimicrobial Therapy in Veterinary Medicine, 2nd edition, pp 564-565: Iowa State University Press.
17. Shivakumar MC, BK Javed-Mulla Pugashetti and S Nidgundi, 2005. Influence of supplementation of herbal growth promoter on growth and performance of broilers. Karnataka Journal of Agricultural Sciences, 18: 481-484.
18. Singh N, Y Hotter and R Miller, 2002. Tulsi, the Mother Medicine of Nature. International Institute of Herbal Medicine. Lucknow, India.
19. Singh VK, SS Chauhan, K Ravikanth, S Maini and DS Rekhe, 2009. Effect of dietary supplementation of polyherbal liver stimulant on growth performance and nutrient utilization in broiler chicken. Veterinary World, 2: 350-352.
20. Gupta S, 2005. Efficacy of 'Tulsi' (*Ocimum sanctum*) leaf powder on growth rate and development of *Trogoderma granarium*. Flora and Fauna Jhansi, 11: 237-243.
21. Singh S and DK Majumdar, 2003. *Ocimum sanctum* phytochemical and pharmacological evaluation. Phytochemistry and Pharmacology, 1-81.
22. Trafalska E and K Grzybowska, 2004. Probiotics An alternative for antibiotics? Wiad Lek, 57: 491–498.
23. Vidyarthi VK, RC Gupta and VB Sharma, 2010. Effect of herbal additives on the performance of broiler chicken. Indian Veterinary Journal, 87: 258-260.
24. Vidyarthi VK, K Nring and VB Sharma, 2008. Effect of herbal growth promoters on the performance and economics of rearing broiler chicken. Indian Journal of Poultry Science, 43: 297-300.
25. WHO, 1997. Antibiotic Use in Food-Producing Animals Must Be curtailed to Prevent Increased Resistance in Humans. Press Release WHO, October 20th, 1997.
26. WHO, 1998. Antimicrobial Resistance. Fact Sheet No. 194, May 1998.