

Influence of Dietary Supplementation of *Achyranthes aspera* Powder on Growth Performance and Economic Production in Broiler Chicken

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ABSTRACT

The present study was designed to contemplate the effect of supplementation of *Achyranthes aspera* powder on growth performance and economics in broiler chicken. A total of 90 day old ven-cobb broiler chicks were randomly selected and allotted to 3 dietary treatment groups (T1, T2 and T3); each group contained 30 chicks distributed in three replicates of 10 chicks each. The treatments T1, T2 and T3 contained basal diet, basal diet + Lincomycin (0.5 g/kg of feed), and basal diet + aerial part powder (ALP) of *Achyranthes aspera* aerial plant (20 g/kg of feed) respectively. The average weekly body weight among all the age groups showed significant differences ($P < 0.05$) except first and second week of age. The overall feed intake (0-6 week) was significantly ($P < 0.05$) lower in birds that received aerial part powder of *Achyranthes aspera* plant.

It is therefore concluded that dietary inclusion of *Achyranthes aspera* powder in the ration may be used as an alternative to antibiotic growth promoters and for better economic production.

Key words: *Achyranthes aspera*, Broiler, Growth promoter, Cost economics.

INTRODUCTION

Antimicrobial compounds are commonly incorporated in poultry diets for promoting growth and control of diseases. The European Union banned feed grade antibiotic growth promoters, due to, not only cross-resistance, but also to the risk of possible multiple drug resistances in human pathogenic bacteria¹. In

view of growing concerns on the extensive loss in poultry due to GI complaints and execution of strict laws to use of harmful synthetic drugs or antibiotics, creates demand for an alternative disease control resource to enhance growth performance and to reduce the use of antibiotic growth promoters².

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Interest and some useful research on Natural Growth Promoters (NGPs) such as phytobiotics (essential oils, powders, extracts and phytochemicals) that can enhance gut health and productivity of birds.

Achyranthes aspera Linn. (Amaranthaceae family) is commonly known as Latjira in Hindi. *Achyranthes aspera* is purgative, laxative, stomachic, carminative and digestive and is useful for the treatment of bronchitis, heart remedies, piles, itching abdominal problems, ascites, rheumatism, abdominal enlargement, rabies and for enlarged cervical by Sharma et al³. *Achyranthes aspera* is one such herb having anti-inflammatory⁴, antioxidant⁵, antimicrobial by Abdullah et al.⁶, hepatoprotective⁷, gastroprotective⁸ and anticancer agent by Uddin et al.⁹ and also various medicinal properties useful as pungent, laxative, antidermatosis, wound healer, blood purifier, poison antidote and cholagogue drug, doopsy, piles, boils, eruptions of skin and other diseases¹⁰. This study was designed to evaluate the effect of dietary supplementation of *Achyranthes aspera* powder on growth performance and economic production in broiler chicken.

MATERIALS AND METHODS

Ethical approval

The experimental design and plan of this study strictly followed the norms of the Institutional Animal Ethics Committee of College of Veterinary Science and A.H., Anjora, Durg, Chhattisgarh.

Plant material

Achyranthes aspera plants were collected from the college of Veterinary Science and A.H. Anjora, Durg. (C.G) campus and was identified by Botany Department,

Govt. V. Y. T. PG Autonomous College, Durg (CG). The fresh plants (aerial part) were collected cleaned, shade dried and powdered with the help of an electrical grinder. Some powdered plant material was also extracted with methanol in Soxhlet's apparatus for 16–24 h at 50-60°C until the solvent was clear. Extract was concentrated using hot water bath. The extract was kept in air tight screw cap vials, labeled and stored in refrigerator for used for phytochemical analysis.

Extraction of phyto-chemical

The freshly prepared methanolic extract of *Achyranthes aspera* as qualitatively tested for presence of chemical constituents. These were identified by characteristic colour changes using standard chemical tests as per the method describe by Parekh and Chanda¹¹.

Experimental Design

A total of 90 day old ven-cobb chicks were randomly divided into three treatments groups (T1, T2 and T3); each group contained 30 chicks distributed in four replicate of 10 chicks each. T1 group (control) was offered basal corn-soya based ration. In T2 (standard) and T3 (test) groups offered basal diet + Lincomycin (0.5 g/kg of feed) and basal diet + aerial part powder (ALP) of *Achyranthes aspera* plant (20 g/kg of feed) respectively. The experimental chicks were reared in the deep litter house as per the standard managemental condition. Feed (commercially available pre-starter, starter and finisher) and water was offered adlib. Standard management and healthcare (vaccination) protocol was followed. The performance in respect to growth (weekly body weight, body weight gain, weekly feed intake and feed conversion ratio) and cost economics was calculated as per standard methods.

Table I: Ingredients composition of Basal diets

Ingredients	Starter	Grower	Finisher
Yellow maize	54.8	55.0	55.32
Deoiled soybean meal	37.00	32.40	28.47
Rice polish	2.6	7.00	10.00
Soybean oil	2.00	2.00	2.50
Dicalcium phosphate (DCP)	1.6	1.60	1.6
Limestone powder (LSP)	0.7	0.70	0.70
L- methionine	0.28	0.26	0.24
Lysine	0.04	0.02	0.17
Sodium bi carbonate	0.14	0.15	0.16
Common salt	0.28	0.29	0.26
Mineral mixture	0.56	0.58	0.58
Total	100	100	100

Statistical analysis

The data were analyzed as per (Snedecor and Cochran¹²) following one way analysis of variance using completely randomized design (CRD) by the Duncan's multiple range test to separate treatment means by use of Statistical Package of the Social Science (SPSS) version 20.0 (SPSS Inc., Chicago, IL, USA). Differences among the treatments were tested for significance at ($p \leq 0.05$) level.

RESULTS AND DISCUSSION

Growth performance of broiler chicken

The observations regarding weekly body weight and body weight gain in broiler chicken are presented in Table II. The average weekly body weight among all the age group

showed significant differences ($P < 0.05$) except first and second week of age. At the end of experiment (6th week) the average live weight in treatment T3 group (2101.97) was significantly higher ($P < 0.05$) than groups T1 (1803.21) and T2 (2065.96). The weekly body weight gain among all the age group showed significant differences.

The observations regarding feed intake and FCR in broiler chicken are presented in Table II. The average weekly feed intake at first week was showed significant difference and T2 were higher feed intake in compare to T1 and T3. The overall feed intake (0-6 week) was significantly ($P < 0.05$) lower in birds those received aerial part powder of *Achyranthes aspera* plant.

Table II: Effect of supplementation of *Achyranthes aspera* powder on weekly body weight and average weekly body weight gain (g) of broiler chicken (Mean \pm SE)

Age	Treatments					
	Weekly body weight (g)			Average weekly body weight gain (g)		
	T ₁	T ₂	T ₃	T ₁	T ₂	T ₃
0 day	49.50 \pm 0.52	49.40 \pm 1.01	51.40 \pm 0.60	-	-	-
1 week	129.50 \pm 4.58	136.23 \pm 1.01	132.80 \pm 1.35	80.00 ^b \pm 3.83	96.83 ^a \pm 1.35	81.37 ^b \pm 1.82
2 week	339.60 \pm 4.36	338.40 \pm 1.82	346.80 \pm 7.83	210.10 \pm 1.42 ^a	192.17 \pm 2.34 ^b	214.00 \pm 7.88 ^a
3 week	655.62 ^b \pm 3.53	666.96 ^b \pm 11.74	704.30 ^a \pm 4.26	316.02 ^b \pm 5.18	328.56 ^{ab} \pm 11.14	357.51 ^a \pm 10.77
4 week	1051.18 ^b \pm 0.49	1059.44 ^b \pm 6.22	1155.29 ^a \pm 13.91	395.56 ^b \pm 3.67	392.49 ^b \pm 16.30	450.95 ^a \pm 16.42
5 week	1546.57 ^b \pm 28.96	1685.51 ^a \pm 11.81	1698.50 ^a \pm 12.83	495.39 ^b \pm 29.43	626.06 ^a \pm 5.68	543.28 ^b \pm 20.33
6 week	1803.21 ^b \pm 21.60	2065.96 ^a \pm 44	2101.97 ^a \pm 27.66	256.64 ^b \pm 49.08	380.45 ^b \pm 41.38	398.16 ^a \pm 17.79

^{ab} Value bearing different superscripts within row differ significantly (* $P < 0.05$)

Table III: Effect of supplementation of *Achyranthes aspera* powder on average weekly feed consumption (g) and average weekly feed conversion ratio in broiler chicks

Age	Treatments					
	Average Weekly Feed consumption (g)			Average weekly feed conversion ratio (g)		
	T ₁	T ₂	T ₃	T ₁	T ₂	T ₃
1 week	117.60 ^b ± 4.54	143.30 ^a ± 4.54	113.20 ^b ± 4.59	1.47 ± 0.10	1.48 ± 0.06	1.36 ± 0.06
2 week	331.85 ^a ± 9.89	290.13 ^b ± 11.78	292.46 ^b ± 5.84	1.57 ^a ± 0.046	1.51 ^{a,b} ± 0.02	1.37 ^b ± 0.02
3 week	581.20 ± 2.79	506.40 ± 9.91	514.43 ± 1.67	1.63 ^a ± 0.026	1.54 ^{a,b} ± 0.09	1.43 ^b ± 0.09
4 week	763.86 ± 28.56	732.23 ± 3.52	727.16 ± 6.57	1.92 ^a ± 0.062	1.81 ^a ± 0.05	1.61 ^b ± 0.05
5 week	1005.70 ± 10.99 ^b	1226.70 ± 16.09 ^a	929.12 ± 10.19 ^c	2.03 ± 0.098 ^a	1.93 ± 0.02 ^a	1.71 ± 0.06 ^b
6 week	1054.60 ^a ± 43.06	924.40 ^b ± 11.42	939.40 ^b ± 20.54	4.40 ^a ± 0.90	2.46 ^b ± 0.23	2.40 ^b ± 0.14
0-6 week	3779.90 ^a ± 45.94	3823.31 ^a ± 35.35	3515.90 ^b ± 28.89	2.15 ^a ± 0.01	1.85 ^b ± 0.02	1.71 ^c ± 0.02

^{ab} Value bearing different superscripts within row differ significantly (*P<0.05)

The result of weekly feed conversion ratio among all the treatments showed significant difference at second, third, fourth, fifth and sixth weeks of age. The overall FCR (0-6 week) of T₂ and T₃ showed significantly (P<0.05) lower and better as compared to T₁.

The results of present study showed a significant improvement in the growth performance in broiler birds of *Achyranthes aspera* treated group may be due to the performance enhancing and anti-stress activity of *Achyranthes aspera*. Results are in accordance with Alamet *et al.*¹³, Asif *et al.*¹⁴ and Bhattacharyya *et al.*¹⁵ who reported that higher

weekly body weight gain and lower FCR were observed when birds are treated with *Achyranthes aspera* it might be due to the anti-bacterial and anti-oxidant properties of *Achyranthes aspera*.

Economic Evaluation

The economics evaluation showed maximum profit per bird in the birds of group T₃ supplemented AAP in basal diet (Rs. 45.58), followed by standard (Rs. 45.06) as compared to control (Rs 19.40). Thus broiler birds in group T₃ and T₂ earned more profit than group T₁.

Table IV. Effect of supplementation of *Achyranthes aspera* plant powder on economics (rupees) of broiler chicks

Treatment	Expenditure per Birds				Total	Income (Sale of Birds)	Profit per Birds
	Cost per Birds	Cost of plants and antibiotics	Feed cost	Miscellaneous cost			
T1(Control)	28.00	-	103.60	65.00	196.60	216.00	19.40
T2 (Standard)	28.00	3.34	106.40	65.00	202.74	240.00	45.06
T3 (<i>Achyranthes aspera</i> powder)	28.00	15.00	98.42	65.00	206.42	252.00	45.58

CONCLUSION

From the above finding, it is concluded that supplementation of *Achyranthes aspera* powder (2%) in feed, beneficial improve broiler performance without any deleterious effect, therefore *Achyranthes aspera* powder can be safely used as an alternative to antibiotic growth promoter in feed of broiler birds. It also increases the profit margin of the birds supplemented with AAP may be attributed to the better efficiency of feed utilization.

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REFERENCES

- Schwarz, S., C. Kehrenberg, and T. R. Walsh. "Use of antimicrobial agents in veterinary medicine and food animal

- production." *Int. J. Antimicrob. Agents*. **17(6)**: 431-437 (2001).
2. Mirzaei-Aghsaghali, Afshar. "Importance of medical herbs in animal feeding: A review." *Ann. Biol. Res.* **3(9)**:918-923 (2012).
 3. Sharma, R.N., Bala, J., Singh, A. and Kaur, P. "Antibacterial Potential of *Achyranthus aspera* Linn procured from Himachal Pradesh, Punjab and Haryana, India." *Res. J.Chem.Sci* **1 (8)**: 80-82(2011).
 4. Bhosale, U.A., Yegnanarayan, R., Pophale, P. and Somani, R. "Effect of aqueous extracts of *Achyranthes aspera* Linn. on experimental animal model for inflammation." *Anc. Sci. Life.* **31 (4)**: (2012).
 5. Kumar, A., Kumari, S.N. and Bhargavan, D. "Evaluation of in vitro antioxidant potential of ethanolic extract from the leaves of *Achyranthes aspera*." *Asian J. Pharm.Clin. Res.* **5 (3)**:(2012).
 6. Abdullah, Latif, A., Afaq, S.H. and Khan, A.U. "Ethnobotanical studies and antimicrobial activity of chirchita (*Achyranthes aspera* Linn.) extracts." *Hamdard Medicus.* **55 (1)**: (2012).
 7. Manjunatha, B.K., Abhilash, N., Hegde, V., Suchitra, M.N. and Vidya, S.M. "Hepatoprotective potency of *Achyranthes aspera*: An in-vivo study." *Int. J. Pharm. Phytopharmacol. Res.* **1 (6)**: 387-390 (2012).
 8. Das, A.K., Bigoniya, P., Verma, N. K. and Rana, A.C. "Gastroprotective effect of *Achyranthes aspera* Linn. leaf on rats." *Asian Pac. J. Trop. Dis.* 197- 201 (2012).
 9. Uddin, Q., Amanullah, Siddiqui, K.M. and Rais-ur-Rahman. "Unani Medicine for Cancer Care: An Evidence-Based Review." *Int. J. Ayu. Alt. Med.* **5 (3)**: 1811–1825 (2015).
 10. Sanjay, P. "A review article on phytochemical and pharmacological profiles of apamarga (*Achyranthes aspera* Linn.)" *International Ayurvedic Medical Journal* **3 (9)**: 2901-2909 (2015).
 11. Parekh, Jigna, and Sumitra Chanda. "In vitro antimicrobial activity and phytochemical analysis of some Indian medicinal plants." *Turkish J. Biol.* **31(1)**: 53-58 (2007).
 12. Snedecor, G.W. and Cochran, W.G. "Statistical methods," 8th edition, Oxford and IBH pub. Co. Kolkata, India (1994).
 13. Alam, M.E., Hossain, M.M.M., Bappa, S.B., Dey, B.K., Hasan-Uj-Jaman, M., Khondoker, S. and Biswas, C. "*Achyranthes aspera* Linn. Extract as feed additives enhances immunological parameters and growth performance in *Pangasius pangasius* against *Pseudomonas fluorescens*." *International journal of fisheries and aquatic studies.* **4 (3)**: 193-198 (2016).
 14. Asif, Q., Chand, N., Qureshi, S., Akhtar, A., Arshad, M., Niamatullah, M. and Malik, S., "Effect of Putkhanda (*Achyranthes aspera*) extract on the body weight gain and gross return of broiler chick." *Pak. J. Sci.* ISSN: 0030-9877 (2011).
 15. Bhattacharyya, Amitav, Satish Kumar Garg, Vinod Kumar, Debashish Roy, K. Ravikanth, Shivi Maini., "Effects of superliv concentrate on the growth, immunocompetence traits and nutrient retention of commercial broilers during extreme winter." *Int. J. Poult. Sci.* **12(1)**: 51-54 (2013).