VOL. 1, NO. 2, AUGUST 2006 ISSN 1990-6145
Journal of Agricultural and Biological Science

www.arpnjournals.com

EFFECT OF DIFFERENT LEVELS OF FEED ADDED TURMERIC (*Curcuma longa*) ON THE PERFORMANCE OF BROILER CHICKS

F. R. Durrani[1], Mohammad Ismail[1], Asad Sultan[1], S. M. Suhail[1], Naila Chand[1] and Z. Durrani[1]
[1]Department of Poultry Science, NWFP Agricultural University, Peshawar, Pakistan
E-mail: drfazliraziq@hotmail.com

ABSTRACT

This study was planned to investigate the effect of different levels of Turmeric (*Curcuma longa)* on the overall performance of broiler chicks. Four experimental rations designated as A, B, C and D having 0%, 0.25%, 0.5% and 1% Turmeric (*Curcuma longa)* was fed to 160 broiler chicks, randomly distributed into 16 replicate, so as to have 4 replicate per treatment and 10 chicks per replicate. The experiment lasted for 35 days. Average weight gain, feed consumption, feed efficiency, dressing percentage, breast weight, thigh weight, mortality and economics were used as a criteria of response. Organ weight including heart, liver and gizzard was also recorded. The mean body weight gain per chick was 646, 547, 734 and 592 g ($P<0.05$) in starter phase and 765, 763, 881 and 720 g ($P<0.05$) in finisher phase for groups A, B, C and D, respectively. The average feed consumption per chick was 1080, 994, 874 and 945 g ($P<0.05$) in starter phase and 1809, 1796, 1690 and 1793 g in finisher phase for groups A, B, C and D, respectively. The average feed efficiency (feed/gain) was 1.6, 1.5, 1.2 and 1.6 in starter phase, while 2.2, 2.3, 2.0 and 2.5 ($P<0.05$) in finisher phase for group A, B, C and D, respectively. The mean dressing percentage was 51, 51, 55 and 50 ($P<0.05$) for groups A, B, C and D, respectively. The mean breast weight was 71, 73, 83 and 73 g ($P<0.05$), while mean thigh weight was 70, 73, 83 and 73 g ($P<0.05$) for groups A, B, C and D, respectively. The average weight of liver was 3.5, 3.1, 3.2 and 3.2 g ($P>0.05$) and the average weight of heart was 8.2, 8.6, 9.0 and 8.0 g ($P>0.05$) for groups A, B, C and D, respectively. The mean gizzard weight was 26, 27, 29 and 27 g ($P>0.05$); the average cost of feed per kg of body weight gain was Rs. 34, 33, 30 and 32. The cost of feed per kg weight gain was highly favourable in treatment C (5 g) as compared to other treatments indicating economic viability of using Turmeric (*Curcuma longa)* as anti-fungle and anti-oxidant @ 5 g/kg of feed. Mortality was 2.5%, 0%, 0% and 2.5% ($P>0.05$) for groups A, B, C and D, respectively. It was concluded that the use of Turmeric (*Curcuma longa)* as feed additive at level of 0.5% enhances the overall performance of broiler chicks. Research to investigate the effect of different levels of Turmeric (*Curcuma longa*) in layers and breeders is recommended.

Keywords: turmeric, broiler, chicks, growth performance.

INTRODUCTION

In Pakistan, broiler production on commercial scale was initiated in 1963; however, broiler production has been progressing with much rapid speed during the past few decades. There were 264 million broilers in the country during 1996-97, which increased to 3000 million during 1997-98, (Agric. Stat. Pak., 1997-98). Most of the poultry farmers are interested in broiler production due to its quick returns, smaller marketing age, less space requirement, and higher weight gains.

Several chemical compounds and antibiotics have been identified in herbaceous plants by researchers, which play a key role in human and animal health.

Due to favorable conditions, many herbaceous medicinal plants are found in Pakistan. These plants have been investigated for a variety of properties by certain institutions in Pakistan such as Pakistan Council of Scientific and Industrial Research (PCSIR), Pakistan Forest Institute (PFI) Peshawar, and Research Institute of Chemistry, Karachi.

The medicinal plant Turmeric (*Curcuma longa)* is commonly used as a spice in human food. Turmeric (*Curcuma longa)* is a perennial herb, and a member of *Zingiberacae* family. The plant grows to a height of 3 to 5 feet and has oblong pointed leaves, which bears funnel shaped yellow flowers. The rhizome is the part used both as spice and medicine. It is usually boiled, cleaned, and dried, yielding a yellow powder.

The active ingredients found in Turmeric (*Curcuma longa)* are curcumin, demethoxycurcumin, bisdemethoxycurcumin, (Wuthi-Udomler *et al*., 2000) and tetrahydrocurcuminoids (Osawa *et al*., 1995). Plant extracts were found to have antifungal, (Wuthi-udomler *et al*., 2000) and anti- oxidative value (Osawa *et al*., 1995). Some pharmacological activities of Turmeric (*Curcuma longa)* as nematocidal (Kiuchi *et al*., 1993) and anti-inflammatory (Ammon *et al*., 1993) were demonstrated. More over (Soni *et al*., 1997) proved the protective effects of Turmeric (*Curcuma longa)* as food additives on aflatoxin-induced mutagenicity and hepatocarcinogenicity. Keeping in view the significant importance of Turmeric (*Curcuma longa)*, this research study was conducted to investigate the effect of Turmeric (*Curcuma longa)* on the overall performance of broiler chicks and to investigate the effect on dressing percentage, vital organs, breast, and thigh of broiler chicks.

MATERIALS AND METHODS

Experimental birds:

One hundred and sixty days old chicks were used in the study. They were kept on the floor in isolated pens and fed commercial ration and water adlibitum.

Experimental design:

The experimental day old chicks were divided into 4 groups. Each group consisting of 40 chicks was designated as group A, B, C and D. Each group was divided into 4 replicates. Checks in group A were fed basal diet , while group B, C, and D were fed basal diet supplemented with 0.25, 0.5, and 1% Turmeric (*Curcuma longa)* during five weeks experimental period. Weekly feed consumption for each group was determined. Mean initial and weekly body weight of birds for each group was determined and then body weight gain was calculated.

By the end of experimental period, 3 birds from each replicate were weighed, numbered and then slaughtered. The weight of breast, and thigh were recorded along with the vital organs (heart, liver and gizzard).

RESULTS AND DISCUSSION

The body weight (734g) obtained in birds fed diet containing Turmeric (*Curcuma longa)* at dietary level of 0.5% was significantly higher (P<0.05) followed by birds fed control diet (646g), 1.0 % (592 g) and .25% (547g) in starter phase (Table-1). In finisher phase higher body weight 881g was obtained by birds fed 0.5% g as compared to control (765g), 0.25% (763g) and 1% (720g) (Table-2). The significant increase in body weight in group C may be due to optimum antioxidant activity of Turmeric (*Curcuma longa)* at the level of 0.5% that stimulate protein synthesis by bird enzymatic system. This is agreement with findings of Osawa *et al*., 1995. Average feed consumption per chick in starter phase was 1097, 994, 874 and 944g (Table-1), and in the finisher phase it was 1808, 1795, 1690 and 1792g for treatments A, B, C and D, respectively (Table-2). Wuthi-udomler *et al*., (2000) also observed less feed consumption in broilers at 5g Turmeric (*Curcuma longa)* per kg of feed. For treatments A, B, C and D, the mean breast weight per chick was 266, 303, 348 and 274g, respectively (P<.005) (Table-3). Gescher (2001) reported that Curcumin had potential to increase breast weight, skin quality and prevent from cancer.

The mean thigh weight was 70, 73, 83 and 73g, respectively (P<.01) (Table-3). The mean liver weight was 35, 31, 32 and 32g for treatments A, B, C and D (P>0.34) (Table-3). The mean heart weight per chick was 8.5, 8.6, 9.0 and 8.0g (P>.30) for groups A, B, C and D (Table-3). Soni *et al.* (1997) reported that Curcuminiods also protects heart from cancer and mutagenicity. For treatment A, B, C and D, the mean gizzard weight was 26, 27, 29 and 27g (P>.005) respectively (Table-3). Lal and Kapoor (1999) observed no improvement in liver and gizzard by application of Turmeric (*Curcuma longa)*. The mean feed efficiency (feed/gain) in the starter phase was 1.6, 1.5, 1.2 and 1.6 (P<.001) for treatment A , B , C and D (Table-1), while 2.2, 2.3, 2.0 and 2.5 (P<.001) in finisher phase (Table-2) for treatments A, B, C and D, respectively. The average dressing percentage, at the end of experimental period was 51.4, 50.7, 55.1 and 50.2% (Table-4) for treatment A, B, C and D, respectively. Mortality at the end of fifth week of experimental period was 1, 0, 0 and 1 for treatment A, B, C and D. The cost per kg of feed for the four treatments was Rs. 34, 32, 30 and 32, respectively (Table- 4).

Table-1. Starter phase of Broiler Chicks.

Group	*Curcuma longa* (g/kg) feed	Mean weight gain per chick (g)	Mean feed consumed /chick (g)	Mean FCR
A	0	646^{ab}	1079^{a}	1.6^{a}
B	2.5	547^{b}	994^{ab}	1.5^{a}
C	5	734^{a}	874^{b}	1.2^{b}
D	10	592^{b}	944^{ab}	1.6^{a}

Table-2. Finisher Phase of Broiler Chicks.

Group	*Curcuma longa* (g/kg) feed	Mean weight gain per chick (g)	Mean feed consumed /chick (g)	Mean FCR
A	0	765^{b}	1808^{a}	2.2^{b}
B	2.5	763^{b}	1795^{ab}	2.3^{ab}
C	5	881^{a}	1690^{b}	2.0^{c}
D	10	720^{b}	1792^{ab}	2.5^{a}

Table-3. Mean Weight of Different Body Organs.

Group	*Curcuma longa* (g/kg) feed	Mean breast weight per chick (g)	Mean thigh weight per chick (g)	Mean liver weight per chick (g)	Mean heart weight per chick (g)	Mean gizzard weight per chick (g)
A	0	70[b]	70[b]	35	8.5	26
B	2.5	73[b]	73[b]	31	8.6	27
C	5	83[a]	83[a]	32	9.0	29
D	10	73[b]	73[b]	32	8.0	27

Table-4. Mean dressing percentage and Feed Cost of Broiler Chicks.

Group	*Curcuma longa* (g/kg) feed	Mean dressing percentage	Mean feed cost/chick (Rs.)
A	0	51[b]	34[c]
B	2.5	50[b]	32[b]
C	5	55[a]	30[a]
D	10	50[b]	32 [b]

REFERENCES

Agricultural Statistics of Pakistan. 1997-98. Government of Pakistan, Ministry of Food, Agriculture and Livestock (Economic Wing) Islamabad, Paksitan. p. 47.

Ammon, H., H. Safayhi, T. Mack and J.Sabieraj. 1993. Mechanism of anti-inflammatory actions of curcumin . J. Ethnophar. 38: 113-9

Kiuchi, F., Y. Goto, N. Sugimoto, N. Akao, K. kondo and Y. Tusda. 1993. Nematocidal activity of turmeric: synergestic action of curcuminoids. Chem. Pharm Bull (Tokyo). 41: 1640-3.

Lans, C. and G. Brown. 1998. Ethno veterinary medicines used for ruminants in Trinidad and Tobago. Prev. Vet. Med., 35: 149-63.

Lal B., Kapoor A. K., Asthana O. P., et al. 1999. Efficiency of Curcumin in the management of chronic anterio- uveitis. Phytother Res. 13(4):318-322.

Osawa, T., Y. Sugiyama, M. Inayoshi and S. Kawakisi. 1995. Anti-oxidative activity of tetrahydrocurcuminoids. Biotech Biochem. 59: 1609-161.

Soni. K. B., M. Lahiri, P. Chakradeo. 1997. Protective effect of food additives on aflatoxin-induced mutagenicity and hepatocarcinogenicity. Cancer Letters. 115(2): 129-133.

Wuthi-udomler, M., W. Grisanapan, O. Luanratana and W. Caichompoo. 2000. Anti-fungal activities of plant extracts. South East Asian J. Trop. Med. Public Health.31, Suppl., 1:178-182.