EFFECT OF DIETARY SUPPLEMENTATION OF GARLIC (*ALLIUM SATIVUM*) ON WEIGHT GAIN AND CHOLESTEROL LEVEL IN BROILERS

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ABSTRACT

A biological trial was conducted for a period of 6 weeks to study the effect of graded levels of Garlic (*Allium sativum*) supplementation on growth performance and muscle cholesterol including serum lipid profile in broilers. The body weight was significantly increased (P<0.01) along with decreased (P<0.01) feed consumption and better FCR in group receiving 1%garlic. Serum total cholesterol, triglyceride, LDL-Cholesterol values were significantly reduced (P<0.01) and serum HDL-Cholesterol value was significantly increased (P<0.01) in the garlic supplemented group as compared to control group. Therefore, 1% garlic supplementation in broiler ration may be effective for improving growth performance with reduced muscle cholesterol concentration and beneficial serum lipid profile.

KEY WORDS: Broilers, Meat and Serum cholesterol, Garlic

INTRODUCTION

Epidemiological and scientific evidences have shown a strong association between total fat intake and number of diseases including coronary heart disease (CHD) and atherosclerosis. Various attempts have been made to lower down the cholesterol level in animal products. Garlic is one of the traditional herb, generally being used in animal and human . Moreover, garlic has the growth promoting effect in broilers (Dey and Samantha, 1993), The folk medicine garlic was used to treat cardiac disease (Essman, 1984). The active constituents in garlic are allin and allicin. Due to sulphur containing compound allicin,garlic has strong antibacterial, anti-fungal and lipid lowering effects. Growth promoting effect of garlic is claimed due to its multidirectional properties viz. anti-microbial, anti-biotic, antiviral, appetizer, improved digestion which leads to weight gain, anti-oxidant, boosting the activity of killer cells and aid in phygocytosis (Day and Samantha, 1993). Therefore, the present study was proposed to evaluate growth promoting and hypocholesterolemic activity of garlic in commercial broiler.

MATERIALS AND METHODS

The study was conducted at Nagpur Veterinary College, Nagpur, (Maharashtra). All the managemental practices required for optimum brooding and rearing of birds were followed. Vaccines were administered for Ranikhet disease of F1 strain at the age of 7th day by I/O or I/N route and Infectious bursal disease of Intermediate strain at the age of 14th day by the route of drinking water. One hundred fifty (150) day-old commercial broiler chicks were distributed randomly into three treatment groups contained fifty chicks in each group i.e. T_o ration containing (Broiler Mash-control group), T_1 ration containing (Broiler Mash (T_0) + garlic powder @ 0.5%) , T_2 ration containing (Broiler Mash (T_0) + garlic powder @ 1%). Each treatment contained fifty chicks with five replicates having ten birds each. The feed was formulated by the following standards prescribed in Bureau of Indian standards (1992). All the experimental broilers were fed with their respective experimental mash *ad libitum* throughout the study period under the managemental conditions. Broiler starter mash was fed to the broiler chicks from 0 to 25 days of age and thereafter finisher was fed. At the end

of 40 to 42 days of age one male and one female from each replicate (total 10 per treatment) was randomly picked up and slaughtered after collecting the blood samples. Total serum and muscle cholesterol was estimated by the procedure of Libernann, (1985) and Wybenga and Pileggi, (1970). Serum HDL cholesterol and Serum triglycerides was estimated by the procedure of Dernacker and Hifrnans, (1980) and Stein and Mayer, (1995). All the data collected throughout the experimental period was analyzed by applying the completely randomized design suggested by Snedecor and Cochran, (1995).

RESULTS AND DISCUSSION

Body weight : The mean body weight of day-old chicks had no significant differences among various experimental rations, while the body weight increases at subsequent week. At the end of 6th week, the average body weight in group T_2 receiving 1% garlic showed significantly increased as compared to group T_1 receiving 0.5% garlic and control group T_0. Body weight gain was apparently higher in birds fed with T_2 ration as compared to birds fed with T_0, T_1. The findings of the present study corroborate with the reports of Shi *et al. (*1999), Prasad and Pandey (1994) found significantly increased body weight in group supplemented with 1% dried garlic in broilers. Contrary to this, Fritz *et al.* (1995) observed numerically decreased body weight in group supplemented with 1% garlic in broilers.

Table1. Average Weekly Body Weight (g) of broilers from different groups

Weeks	T0	T1	T2
Day Old	49.4±0.08	49.11±0.08	49.45±0.13
1	129.42±0.42	130.5±0.65	129.80±0.60
2	325.50±0.82	329.30±2.14	331.20±1.12
3	626.40±2.35	629.20±1.82	631.20±1.82
4	926.0 ^{b}±1.44	933.60 ^{a}±1.07	937.40 ^{a}±1.24
5	1342.60 ^{b}±2.06	1348.80 ^{ab}±2.41	1353.20 ^{a}±1.71
6	1756.50 ^{c}±4.91	1762.0 ^{bc}±3.46	1775.0 ^{a}±4.27

The means with same superscript are not significantly different **Significant at1 % level

Table 2.Average Weekly Feed Consumption (g) of broilers from different groups

Weeks	T0	T1	T2
1	159.0±2.91	155.80±4.01	155.0±2.73
2	386.0±7.31	387.0±8.74	387.0±7.51
3	583.0±5.14	577.0±4.35	576.0±5.56
4	591.0±3.67	587.0±5.14	587.0±5.14
5	814.0±5.33	809.0±2.91	807.0±1.22
6	885.0 ^{a}±11.72	821.0 ^{bc}±9.66	819.1 ^{c}±5.12

The means with same superscript are not significantly different **Significant at1 % level

Feed Consumption and Feed Conversion Ratio: The weekly mean feed consumption of the birds fed with T_0 ration was significantly (P<0.01) higher than the birds fed with T_1 and T_2 rations (Table 2). The mean FCR of the birds with Group T_2 receiving 1% garlic showed significant reduction (P<0.01) as compared to control group, however the difference between T_1 and T_2 was non-significant. Sarica *et al.,* (2005) ,Freitans *et al.,* (2001) recorded no significant difference in FCR in treatment groups. The present findings were in accordance with Prasad and Pandey (1994) and who observed numerically decreased FCR when 0.25, 0.5% garlic was supplemented in cockerels.

Serum and Muscle cholesterol level : The cholesterol level of breast, thigh, serum in commercial broilers was also significantly influenced by different dietary treatments. This was in accordance with the findings of Qureshi *et al.* (1983) who recorded the similar correlation between the age of the broiler and the muscle total cholesterol level in the broiler when compared to the control group. The broiler feed with 0.5% and 1% garlic had reduced serum, breast and thigh muscle cholesterol level as compared to the control (Table 4). Group T_2 showed significantly increased (p<0.01) serum HDL cholesterol value as compared to group T1 and control group T_0. The difference between group T_1 and T_0 was significant. The serum triglyceride and LDL value was significantly decreased (p<0.01) in Group T_2.

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Table 3. Average Weekly FCR of broilers from different groups

Weeks	T0	T1	T2
1	1.99±0.04	1.91±0.03	1.92±0.02
2	1.96±0.04	1.94±0.03	1.92±0.02
3	1.93±0.01	1.92±0.02	1.92±0.02
4	1.97±0.02	1.93±0.02	1.92±0.01
5	1.95±0.01	1.95±0.01	1.94±0.01
6	2.14^{a}±0.02	1.99^{bc}±0.01	1.94^{c}±0.02

The means with same superscript are not significantly different **Significant at1 % level

Table 4. Effect of garlic supplementation on serum, muscle cholesterol level in broilers

	Breast Muscle Cholesterol (mg %)	Thigh Muscle Cholesterol (mg %)	Serum Total Cholesterol (mg/dl)	Serum HDL Cholesterol (mg/dl)	Serum Triglyceride (mg/dl)	Serum LDL Cholesterol (mg/dl)
To	65.06^{a}±0.73	97.77^{a}±1.31	176.20^{a}±4.55	67.53^{a}±1.71	88.12^{a}±4.26	91.05^{a}±4.94
T1	60.66^{b}±1.04	92.57^{bc}±0.86	160.54^{ab}±5.74	74.09^{b}±1.43	75.79^{bc}±2.14	71.29^{ab}±5.99
T2	54.94^{c}±1.41	91.65^{c}±1.10	147.56^{b}±6.96	80.76^{c}±1.17	70.45^{c}±1.01	52.71^{b}±7.23

The means with same superscript are not significantly different. **Significant at1 % level

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