

Effect of different diets of full fat soybean (flake) on the meat composition of broilers

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ABSTRACT

In the three feeding trials of broilers the meat composition at 6 weeks and 8 weeks age was studied. The meat composition at 6 weeks age indicated that the water content in Trial-I, II and III irrespective feed treatment ranged from 73.23 to 74.70 per cent. The corresponding values at 8 weeks age ranged from 71.70 to 72.75 per cent. There was no significant difference in all the treatments as well as all the trials. However, water content in the meat of birds at advanced age (8 weeks) was comparatively less than 6 weeks age. The protein content of meat at 6 and 8 weeks age ranged from 18.06 to 18.25 per cent. The protein percentage of meat was neither affected by treatment diets nor by different trials. The fat content in meat at 6 weeks age ranged from 6.03 to 7.33 per cent in all treatments and all the three trials. At 8 weeks age fat content in meat was ranged from 7.83 to 8.90 per cent. The fat content of meat was higher in T_3 followed by T_2 , T_1 and T_0 in all the trials. The fat content of meat at 8 weeks was significantly higher than 6 weeks meat in all the treatment diets of all the trials. The ash content in the meat at 6 weeks age amongst the three trials did not show much differences and remained almost similar. Similar trend was observed 8 weeks age however the results indicated that ash content in the meat higher at increasing age. Amongst the different treatment diets fish meal containing diet (T_0) showed higher ash percentage. The ash content in the meat was in decreasing order with increase in FFSB level in the diet. In T_3 containing diet meat ash content was significantly lower than T_0 , T_1 and T_2 .

Key words : Meat composition, broiler, soybean

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INTRODUCTION

For getting tender meat broilers are marketed at five to six weeks age. However in broiler market, rates are fluctuating very much and many times broiler owners have to bear the losses. To avoid such losses the birds are retained even up to eight weeks of age. At eight weeks of age the tenderness is not affected but what sort of chemical changes takes place at different age of marketing of birds is to be studied. Therefore in the present experiment chemical composition of broiler meat at six and eight weeks age under different diets have been studied.

MATERIALS AND METHODS

In this investigation three experimental trials were conducted i.e. in the month of September-October, November-December (2000) and March-April, 2001. During these trials different diets were given to the birds, viz., T_0 (Control) received 5 per cent fish meal, T_1 , T_2 and T_3 received the diet containing 5, 10 and 15 per cent full fat soybean flake (FFSB), respectively.

After attaining 6 weeks age and 8 weeks age, 5 birds from each treatment were slaughtered for studying the meat composition. The birds were fasted for 12 hours for complete emptying of crop and intestine. The birds were weighed and sacrificed. The birds were slaughtered by modified Koshers' method (Panda and Mohapatra, 1998). In this method the jugular vein was severed just below the ear taking care not to cut the wind pipe and oesophagus. This method is widely used since the birds could be better bled. The meat analysed by AOAC (1990) method for determination of water, protein, fat and ash content.

RESULTS AND DISCUSSIONS

Water Content in meat :- Raw meat composition (Table 1) indicated that the moisture percentage at 6 weeks age was in the range of 73.34 to 74.70, 74.15 to 74.66 and 73.23 to 73.77 in Trial-I, Trial-II and Trial-III, respectively. Water content of meat in T_0 was significantly higher than T_1 , T_2 and T_3 indicated that

there was significant difference in all the treatments as well as in the three trials. However, in the Trial-III water content was less as compared to the first two trials, which might be due to hot climatic conditions prevailing during that trial.

Water content in meat at 8 weeks age (Table 2) ranged from 72.43 to 72.86, 72.50 to 72.95 and 71.70 to 71.95 in Trial-I, Trial-II and Trial-III, respectively. The water content in meat of T_0 was significantly higher than T_1 , T_2 and T_3 . There was significant different in all the treatments as well as in the three trials. At eight weeks also the water content in meat of third trial was comparatively less than the first two trials. Sahoo and Shingari (1992) reported the moisture percentage of broiler meat ranging from 70.5 to 71.9. They further stated that in summer and spring season moisture percentage in the meat was comparatively less than winter season.

Protein Content in meat: The protein content in the

meat of birds in Trial-I, Trial-II and Trial-III at 6 weeks age was almost similar which ranged between 18.06 and 18.25 per cent. The protein percentage of meat was thus not affected by various treatment diets.

Similarly at the age of 8th week (Table 2) the protein content of meat in all three trials was in the range of 18.12 to 18.25 per cent. The protein percentage of meat at 6 weeks and 8 weeks age remained almost constant. There was no significant difference in all the treatments at 6 weeks and 8 weeks age. Bonami et al. (1970) revealed that the different levels of fish meal in the diet did not give any difference in the meat composition. Similarly Sahoo and Shingari (1992) reported that the protein per cent of meat did not change at 6 and 8 weeks age.

Fat Content in meat: The fat content in the meat from 6 weeks broiler ranged from 6.33 to 7.30, 6.03 to 6.52 and 6.90 to 7.33 per cent in Trial-I, Trial-II

Table 1. Average chemical composition of meat of broilers under different treatment diets and trials at 6 weeks age

Treatment	Parameters (per cent)			
	Water	Protein	Fat	Ash
Trial - I				
T ₀	74.70	18.06	6.33	0.84
T ₁	73.83	18.06	6.67	0.82
T ₂	73.67	18.12	6.95	0.82
T ₃	73.34	18.12	7.30	0.77
Cal. 't' value	5.293	1.845	3.141	2.443
Trial - II				
T ₀	74.66	18.00	6.03	0.85
T ₁	74.30	18.12	6.37	0.83
T ₂	74.27	18.12	6.45	0.83
T ₃	74.15	18.15	6.52	0.80
Cal. 't' value	5.435	2.153	2.572	2.315
Trial - III				
T ₀	73.77	18.12	6.90	0.83
T ₁	73.70	18.18	6.97	0.83
T ₂	73.58	18.18	6.97	0.82
T ₃	73.23	18.25	7.33	0.76
Cal. 't' value	6.145	2.233	3.015	2.714

Each value is an average of 5 observations

Table 2 : Average chemical composition of meat of broilers under different treatment diets and trials at 8 weeks age

Treatment	Parameters (per cent)			
	Water	Protein	Fat	Ash
Trial - I				
T ₀	72.86	18.12	8.07	0.88
T ₁	72.75	18.12	8.00	0.87
T ₂	72.55	18.18	8.15	0.82
T ₃	72.43	18.18	8.23	0.80
Cal. 't' value	5.447	1.935	2.524	3.013
Trial - II				
T ₀	72.95	18.12	7.83	0.89
T ₁	72.77	18.15	7.95	0.89
T ₂	72.63	18.15	8.03	0.87
T ₃	72.50	18.18	8.17	0.85
Cal. 't' value	5.177	1.623	2.995	2.146
Trial - III				
T ₀	71.95	18.18	8.65	0.87
T ₁	71.91	18.15	8.73	0.86
T ₂	71.82	18.25	8.87	0.86
T ₃	71.70	18.25	8.90	0.84
Cal. 't' value	4.166	1.983	3.115	2.238

Each value is an average of 5 observations

and Trial-III, respectively. The fat per cent was significantly higher in T₃ (7.34%) followed by T₂ (6.95%), T₁ (6.67%) and the lowest was in T₀ (6.33%) in the first trial.

In the Trial-II, similar trend was observed i.e. T₃ (6.52%) containing significantly higher fat followed by T₂ (6.45%), T₁ (6.37%) and the lowest was in the T₀ (6.03%).

The fat content of meat from Trial-III also indicated the similar pattern. The T₃ group contained significantly higher fat (7.33%) in the meat followed by T₂ (6.97%), T₁ (6.97%) and T₀ (6.90%) groups respectively. The higher fat content in T₃ and T₂ may be due to more synergic effect of poly-saturated acid resulting in higher level of full fat soybean diet. Barua et al. (1991) reported that the increase in ambient temperature increased carcass fat content. They observed non-significant differences in the carcass

fat content of broilers when reared at 27°C and 29°C. However, when temperature was higher than 30°C fat content increased in the carcass.

In trial-III fat per cent of meat was comparatively higher because during hot part of the year water losses from the body of bird might be more leading to comparatively less water content of meat and higher fat content. The fat content in meat of 8 weeks broilers in Trial-I, II and III ranged from 8.00 to 8.23, 7.83 to 8.17 and 8.65 to 8.90, respectively. The fat content in meat was higher in T₃ followed by T₂, T₁ and T₀ in all the trial. It was observed that the fat content in 8 weeks meat was higher than 6 weeks meat. Barua et al. (1991) revealed that the fat content in carcass increased with body weight and age, the percentage of water, protein and ash decreased with increased fat content. According to Singh and Panda (1992) fat content in carcass was the most variable component and any increase in the

fat was accompanied by a parallel decrease in water content and vice-versa.

Ash content in meat: The chemical analysis of meat at 6 weeks age showed that the total ash content in the meat was the highest in T_0 (0.84%) followed by T_1 and T_2 (0.82%) and the lowest was in T_3 (0.77%) in Trial-I. Similar trend was observed in Trial-II and Trial-III. Student 't' test indicated that in all the trials T_0 , T_1 and T_2 were at par, only T_3 was significantly lower in ash content than the rest of treatments.

The results of 8 weeks in Trial-I indicated that ash content in meat was significantly higher in T_0 (0.88%) and T_1 (0.87%) than T_2 (0.82%) and T_3 (0.80%). Similar trend was observed in Trial-II and Trial-III.

The ash content in the meat at 6 weeks age amongst the three trials did not show much differences and remained almost similar. Although the similar trend was observed at 8 weeks, the results indicated that ash content in the meat was higher at this age. Further, it was also observed that amongst the different treatment diets studied the fish meal containing diet (T_0) showed higher ash percentage. The ash content in the meat was in decreasing order with increase in FFSB level in the diet. There was not much difference in the ash content of meat in T_0 , T_1 and T_2 . Whereas in T_3 diet ash content in the meat was significantly lower than the T_0 , T_1 and T_2 . It may be due to higher fat content in the diet containing 15 per cent full fat soybean.

The higher level of un-extracted soybean diet intake reduced the calcium and phosphorus retention (Leeson et al. 1988). Similarly Mahapatra (1992) observed that the high fat intake in the diet interfered with the absorption of calcium and vitamin-D3.

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