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EFFECT OF POPPY SEED MEAL IN BROILER DIETS

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The purpose of the study is to evaluate poppy seed meal (PSM) addition to the broiler rations and its effects on performance, carcass yield, relative organ weights, pathological effect on the tissues and blood parameters.

Materials and Methods

The experiment was conducted using unsexed broiler chicks of 480 (Cobb, which were randomly divided into 6 experimental groups, each containing 80 birds. Groups 1,2,3,4 and 5 were fed the rations containing 5,10,15,20 and 25% PSM respectively. Control diet had no PSM. Each group included 4 replicates of 20 birds. Feed and water were offered *ad libitum*. Body weight gain (BWG) and Feed Convertion ratio (FCR) were determined weekly. Randomly 16 chickens were selected and slaughtered at the end of the experiment in each group (total 96 birds) to determine the individual carcass weight, relative organ weight, pathological changes and blood parameters. A starter diet from day old to 28 days of age and a grower diet from 28 days of age to end of the experiment was used. Starter and grower diets formulated with usual ingredients like corn, soyabean meal etc to meet the nutrient requirements of broilers (NRC, 1984). The cholesterol, triglyceride, alanin amino transferase (AST) and aspartat amino transferase (ALT) levels were analyzed with Roche kits procedure in serum by using autoanalyser (Hitachi Inc. Japan) device. The chemical composition of PSM analysed as A.O.A.C. (1984) method. Systemic necropsies were performed in broilers slaughtered at sixth weeks of age. (Luna, 1969). Data were statistically analysed using Duncan's multiple range procedure. SPSS pocket program was used for statistical analysis (SPSS, inc., 1960).

Results and Discussion

Chemical composition of PSM revealed that it contain 35.5% protein and 2993 kcal/kg ME. Body weigh gain was significantly ($P<0.001$) influenced by dietary PSM upto 25% when compared to control. The same trend was observed for feed consumption (FC). Supplementation of PSM to quail diet caused a significant ($P<0.001$) increase in cumulative feed consumption. However, no significant differences were observed FCR (Table 1).

Inclusion of the PSM to broiler diet, did not result any change in carcass yield. Weights of liver and heart reached the lowest value by the increasing level of the PSM supplementation. Significance ($P<0.001$)

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changes were determined between groups for organ weights (Table 2).

Some pathological changes were observed in other visceral organs such as liver, kidneys, lungs, proventriculus and ventriculus. Histopathological changes similar to tubulonephrosis were detected in kidneys. There were severe degenerative and necrotic changes in both proximal and distal convoluted tubular epithelium in kidney.

The PSM added to the diet upto 25% did not have any negative effects on BWG of broilers. Even PSM contained rations provided better results than that of control diet. These results were in agreement with those reported by Bayram and Akinci (1998). The present study also demonstrated that the addition of PSM increased the feed consumption than that of control diet. Although the BWG and feed intake of the experimental groups were higher than that of control group, FCR were not significantly affected in all groups. Bayram and Akinci (*loc. cit*).

The cholesterol, triglyceride and ALT levels were not affected by PSM. However, AST levels increased when PSM was added 10, 15, 20 and 25% of the diet ($P<0.001$). (Table 3).

Mortality rates recorded in all groups were in normal range during the experiment. Changes similar to tubulonephrosis might be the result of the excretion of the opium alkaloids. Erosions on stomach mucosa, desquamative changes and congestion in intestinal mucosa were reported in rats (Pahwa and Catterjee, 1989). In the present study, erosive and desquamative changes on proventricular and ventricular mucosa with local ulcers were observed. These ulcers might be the cause of enlargement in proventriculus and ventriculus. Pathological changes primarly on parenchymal tissues were attributed to the toxicological effects of opium alkaloids in PSM.

Berson *et al.*, (2001) postulated that bufrenorphin and norbufrenorphin, which are opioid metabolites covalently bound with microsomal proteins of liver, induced the decrease in glutathione, while stimulated the increase in intracellular calcium levels and caused necrosis of cells by decreasing ATP. In this study, increase in AST and ALT might be attributed to the hepatocyte destruction due to the degenerative and necrotic changes. This effect was increased with the elevated levels of PSM in the diet. Pathological findings were in agreement with AST levels in serum. The results of this study showed a considerable increase in plasma AST after PSM intake. It was reported that opioids given orally increased the AST levels in the serum (Wallach, 1986). It was also reported that opioids given orally may affect metabolism (Mc Kim, 1997).

Summary

The present experiment was conducted to determine the effect of rations containing different levels of poppy seed meal (PSM) on BWG, FC, FCR, carcass yield, pathological changes and also some blood parameters in broiler. Totally 480 day old broiler chicks (Cobb) were divided into 6 groups and fed with containing a control (0% PSM) and 5 experimental diets containing different levels (5,10,15, 20 and 25%) PSM. Diet containing different levels of PSM significantly ($P<0.001$) increased in BWG and

Table 1 : Performance Data of the Groups (Mean ± SE)

Experimental Groups

Weeks	Control (0% PSM)		Group 1 (5% PSM)		Group 2 (10% PSM)		Group 3 (15% PSM)		Group 4 (20% PSM)		Group 5 (25% PSM)	
					Mean Body Weight gain, g							
1-6	1524.66	26.98[d]	180.36	23.12[c]	1987.44	25.86[b]	2118.26	28.08[a]	2083.28	24.60[a]	2077.82	27.54[a]
					Cumulative feed intake, g							
1-6	2400.62	152.11[d]	2857.81	49.90[c]	2979.92	73.90[bc]	3212.86	14.75[ab]	3276.07	93.51[a]	3330.43	64.72[a]
					Feed conversion ratio							
1-6	1.74	0.0093	1.63	0.0083	1.64	0.0088	1.67	0.0016	1.67	0.0057	1.75	0.0081

Means within a row not sharing a common superscript are significantly different, (P<0.05)

Table 2 : Body and Carcass Weights (g) and the Relative Organ Weights of the Groups (Mean ± SE)

Experimental Groups

	Control (0% PSM)		Group 1 (5% PSM)		Group 2 (10% PSM)		Group 3 (15% PSM)		Group 4 (20% PSM)		Group 5 (25% PSM)	
					Mean Body Weight gain, g							
Live wt.	1585.11	62.74	1912.43	56.22	2174.64	50.86	2248.54	60.26	2197.41	65.09	2230.61	62.32
Carcass wt.	1134.19	19.52[c]	1367.13	34.00[b]	1591.69	31.81[a]	1638.73	35.84[a]	1608.19	29.32[a]	1629.09	34.88
Carcass yield	72.39	2.25	72.18	2.25	73.41	1.11	73.27	1.59	73.75	1.55	73.37	1.29
Liver wt. ↑	2.83	0.12[a]	2.51	0.10[bc]	2.27	0.0046[bc]	2.25	0.0065[c]	2.27	0.0073[c]	2.22	0.0072[c]
Heart wt. ↑	0.81	0.0047[a]	0.67	0.0037[b]	0.57	0.0014[c]	0.55	0.0019[c]	0.53	0.0026[c]	0.51	0.0025[c]

Means within a row not sharing a common superscript are significantly different, (P < 0.05)

↑ : The ratios of heart and liver weights to body weights (g/100g)

Table 3 : The Cholesterol, Triglyceride, AST and ALT Values of Groups (Mean ± SE)

Experimental Groups

	Control (0% PSM)		Group 1 (5% PSM)		Group 2 (10% PSM)		Group 3 (15% PSM)		Group 4 (20% PSM)		Group 5 (25% PSM)	
					Mean Body Weight gain, g							
Cholesterol	109.80	6.04	106.40	6.39	107.10	5.58	98.60	4.76	100.60	2.65	102.80	2.00
Trigliseride	57.70	3.90	42.50	4.10	47.00	5.05	46.40	3.72	51.50	6.64	51.20	1.53
AST(SGOT)	288.60	9.60[b]	275.40	9.35[cd]	344.60	10.74[a]	345.20	16.64[a]	316.60	9.44[ab]	310.50	13.76[ab]
ALT (SGPT)	8.6	2.03	4.80	0.55	7.20	1.95	8.50	1.96	6.80	1.41	3.10	0.55

Means within a row not starting a common superscript are significantly different, (P<0.05)

FC, but did not cause significant change in the FCR and carcass yield; and significantly (P<0.001) reduced the proportional organ weights. Although no significant differences were observed among the groups for cholesterol, trigliseride, AST and ALT levels were found the highest in the PSM (P<0.01). Some pathological lesions in organs of the birds fed different levels of PSM for 42 days were observed.

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