

## EFFECT OF VARYING LEVELS OF PESTICIDE AND PROTEIN ON THE CARCASS CHARACTERISTICS OF BROILERS

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The experiment was conducted on 240 day-old commercial broiler chicks in a completely randomized design with 2 x 4 factorial arrangement. Eight experimental starter rations were formulated containing 23% or 20% crude protein each with 0, 50, 100 or 150 ppm level of pesticide. Similarly, eight finisher rations containing 19% or 20% crude protein, each with above said levels of pesticide, were formulated. These rations were fed *ad libitum* for 7 weeks. At the end of the experiment, two birds from each replicate were slaughtered at random. It was observed that 23% protein with pesticide (50 ppm) adversely affected the body weight gain, gible weights and carcass yield in chicken. Abdominal fat decreased significantly with the increase of the pesticide.

### INTRODUCTION

Poultry meat and eggs are rich sources of protein of superior quality. Poultry industry is being handicapped on account of higher cost of poultry feeds which account for more than 65-70% of total cost of production. At present, the protein level of 23% and 3000 k.cal., ME kg-I for broiler starter and a protein level of 20% and 3200 k.cal ME kg-I for broiler finisher ration has been recommended by NRC (1984). It is known that cotton-seed meal, cotton-seed cake and wheat are important ingredients in poultry feeding. Different dangerous insecticides and pesticides are being used in spraying wheat and cotton crops. The toxic effects, thereof, appeared as hydropericardium, ascities, mycotoxin, lesions consisting of swelling and congestion in the kidneys (Qureshi, 1988). The present study was conducted to see the influence of different levels of crude protein and pesticide on carcass characteristics of broiler.

### MATERIALS AND METHODS

Two hundred and forty day-old broiler chicks were raised for a period of 7 weeks. The chicks were randomly divided into 24 replicates of 10 chicks each. Eight experimental starter rations were formulated containing protein 23 and 20% each with 0, 50, 100 and 150 ppm level of pesticide (Lennate). Similarly, 8 finisher rations containing 19 and 20% protein each with above said levels of pesticides were formulated. Each ration has the same level of energy i.e. 3000 k.cal., ME kg-I during starter phase and 3200 k.cal., ME kg-I during finisher phase. The starter rations were fed for a period of 28 days. Room temperature was maintained at 35 °C at the start of the experiment and was lowered by 3 °C each week till it reached to 23° C. At the end of 7th week, two birds were randomly selected from each replicate, slaughtered and scalded by immersing in water at temperature ranging from 180-190 °F as adopted by Lull (1976).

The data was analyzed statistically by using analysis of variance technique as described by Steel and Torrie (1980).

Dressing percentage: The average dressing percentage of broiler birds fed on various experimental rations was found to be 72.1,

Table 1. Analysis of variance of the data on dressing percentage, heart weight and gizzard weight

Source of variance	Df	F. values		
		Dressing percentage	Heart weight	Gizzard weight
Pesticide	3	13.60**	8.55**	0.87 <sup>NS</sup>
Protein	1	4.60*	0.23 <sup>NS</sup>	4.51*
Pesticide X Protein	3	1.33 <sup>NS</sup>	4.05**	1.97 <sup>NS</sup>
Error	40			

\*F Significant, \*\* = Highly significant, NS = Non-significant.

## RESULTS AND DISCUSSION

Weight gain: The average weight gain chick-

during the experimental period was 1422.24, 857.05, 1147.08 and 1259.83 g in the groups fed on ration containing 23% protein during starter and 19% during finisher phase each with pesticide level, 0, 50, 100 and 150 ppm, respectively. The weight gain chick- in the groups reared on 20% protein during the both phases with pesticide levels of 0, 50, 100 and 150 ppm averaged 1401.40, 1156, 1142.60 and 1250.60 g, respectively. The analysis of variance revealed significant differences due to pesticide, protein and their interaction. This situation perhaps due to the fact that feed consumption reduced and high protein level caused an increase in the true growth of broiler birds. Whereas, the high pesticide and high protein concentration led to activity of pesticide as dominant leading to abnormal accumulation of water in the body and cause increase in the body weight. The results of the present finding are in accordance with Prasad and Sadagopan (1978) and Shoya *et al.* (1979).

69.07, 68.74 and 68.26 on 23% protein during starter and 19% protein during finisher phase without or with 0, 50, 100 and 150 ppm level of pesticides while those reared on 20% protein both during starter and finisher phases without or with the similar level of pesticide gave respective dressing percentage of 70.33, 68.99, 68.61 and 66.70. The analysis of variance (Table 1) revealed significant differences due to pesticide level, protein level and non-significant due to interaction of pesticide and protein. The birds reared on 23 or 19% protein gave significantly more dressing percentage than those fed on 20% protein both during starter and finisher phases. This may be attributed to more availability of amino acids for tissue synthesis and ultimately more growth of birds. The higher level of pesticide disturbed the utilization of amino acids in the body which ultimately resulted in low growth rate and dressing percentage of birds fed on such rations.

Heart weight: The average percentage of heart weight with respect to dressed weight was found to be 1.09, 1.24, 1.36 and 1.74 on

23% protein during starter and 19% protein during finisher phase without or with 0, 50, 100 and 150 ppm level of pesticide, respectively. While 1.28, 1.33, 1.37 and 1.45% heart weight with respect to the dressed weight was noted on 20% protein fed both during starter and finisher phase without or with the same level of pesticide. The analysis of variance (Table 1) revealed significant differences due to pesticide, interaction of pesticide and protein and non-significant due to protein level. There were non-significant differences in respect of heart weight among all the birds reared on other rations except those fed ration having high amount of protein (23 or 19%) with high level of pesticide (150 ppm). It indicates that the chicks were susceptible to the attack of hydropericardium due to exciting activity of pesticide in the feed. Enlargement of heart and accumulation of water in the pericardial sac would have resulted with the passage of time. The probable reason is that pesticide, containing aldehyde group in their structure, being used on large scale as spray in various crops could serve as exciting cause of hydropericardium. Liver and heart may be the first target and the observations revealed so. The results of the present study are in accordance with the findings of McCune *et al.* (1962) who fed polychlorinated biphenyl to the birds in their rations and reported hydropericardium and enlarged heart in the chicken. These results are also supported by the observations of Hofstad (1978) that chlorinated hydrocarbon in the diets of chicken may result in the enlargement of heart and amber-coloured fluid in the pericardial sac.

**Gizzard weight:** The average gizzard weight percentage with respect to dressed weight was 2.87, 3.41, 3.31 and 3.06 on 23% protein during starter phase and 19% protein during finisher phase without or with 0, 50, 100 or 150 ppm level of pesticide, respectively.

While those fed on 20% protein during starter and finisher phase, without or with the same level of pesticide was 2.92, 2.76, 2.93 and 2.73%, respectively. The statistical analysis (Table 1) showed non-significant differences due to pesticide and interaction of pesticide and protein but significant difference was observed due to protein level. It is, thus speculated that more intake of protein makes more availability of amino acids which contributes in tissue synthesis of gizzard thus increases its weight.

**Abdominal fat:** The average total abdominal fat yield was found to be 45.33, 15.33, 21.00 and 19.83 g on 23% protein during starter phase and 19% protein during finisher phase without or with 0, 50, 100 and 150 ppm of pesticide, respectively. While those fed on 20% protein during both starter and finisher phases with the same amount of pesticide yielded 34.16, 26.66, 20.33 and 18.33 g, respectively. The analysis of variance (Table 2) showed non-significant differences due to pesticide and interaction of pesticide and protein. It revealed that the birds fed on rations without pesticide had significantly higher amount of abdominal fat as compared with those fed on all other rations.

**Kidney weight:** The average kidney weights were 11.82, 12.41, 12.49 and 12.56 g on rations containing 23% protein during starter phase and 19% protein during finisher phase without or with 0, 50, 100 and 150 ppm level of pesticide, respectively. The birds reared on 20% protein during both starter and finisher phase without or with similar levels of pesticide had kidney weights 10.81, 11.11, 11.84 and 12.62 g, respectively. The analysis of variance (Table 2) revealed non-significant differences due to pesticide, protein and their interaction. Although, the results were non-significant, however, gradually increased in kidney weights, with increased pesticide level were observed. These results are supported by Banis (1979).

Table 2. Analysis of variance of the data on abdominal fat, kidney weight, spleen weight and pancreas weight

Source of variance	Of	F. values			
		Abdominal fat	Kidney weight	Spleen weight	Pancrease weight
Pesticide	3	41.25**	0.11NS	3.64*	2.23*
Protein	1	0.0NS	0.44NS	0.08NS	0.23NS
Pesticide x Protein	3	9.15**	2.10NS	0.09NS	1.63NS
Error	40				

\* = Significant, \*\* = Highly significant, NS = Non-significant.

**Spleen weight:** The average spleen weights of birds were 2.95, 2.37, 2.34 and 2.25 g on ration containing 23% protein during starter phase and 19% protein during finisher phase without or with 0, 50, 100 or 150 ppm level of pesticide, respectively. Those fed on 20% protein both during starter and finisher phases without or with the similar level of pesticide had average spleen weight 3.05, 2.81, 2.55 and 2.33 g, respectively. Statistically (Table 2), significant differences were observed due to pesticide and non-significant differences due to protein and their interaction.

**Pancrease weight:** The average pancreas weights in broiler chicks were 3.10, 2.02, 2.36 and 2.70 g on rations containing 23% protein during starter and 19% protein during finisher phase without or with 0, 50, 100 and 150 ppm level of pesticide, respectively. While the birds fed on 20% protein both during starter and finisher phase without or with similar level of pesticide had pancreas weights of 2.74, 2.68, 2.48 and 2.18 g, respectively. The analysis of variance (Table 2) revealed significant differences due to pesticide and non-significant due to protein and their interaction.

**Mortality:** 49 chicks died during the experi-

mental period. Out of them 32 died due to hydropericardium and remaining birds died due to miscellaneous causes. It is interesting to note that when protein levels were high in the ration, the lower dose of pesticide caused high mortality but as the pesticide level increased, there was gradually decrease in mortality. This indicates that interaction between two factors was positively working for the onset of hydropericardium. Mortality was minimum with the lowest level of pesticide (50 ppm) when low protein ration (20%) was offered to the birds. But increased to 25% with higher level of pesticide. The observation leads to the conclusion that pesticide level did exert an exciting action for the onset of hydropericardium. But, higher levels of protein exerted much adverse effects on mortality. It seems that high plan of nutrition has some adverse effects on health of chicken and may become one of the causes of a condition, known as hydropericardium in chicken.

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