

EFFECT OF DETOXIFIED FEED ON THE PERFORMANCE OF BROILER CHICKS

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One day old broiler chicks (Hubbard) numbering 120 were fed on control, control ammoniated, contaminated 500 µg/kg aflatoxin and decontaminated rations for eight weeks showed weight gained 1641, 1916, 1345 and 1734 gm and feed efficiency values were 2.87, 2.53, 3.59 and 2.85 respectively. Mortality percent was higher with contaminated diet. Significant differences were observed regarding weight gain feed efficiency, dressing percentage and liver weights. Livers with haemorrhages were observed with contaminated feed. Ammoniation of feed improved feed efficiency and lowered the chances of haemorrhages and mortality. Blood picture values showed non-significant differences.

Key words: Aflatoxin, Detoxification, Nutritive value.

INTRODUCTION

The toxic substances produced by molds, have presented the poultry and livestock industries with major problems during recent years. Contamination of feed mycotoxins generally takes place in hot and humid condition during storage. This results in a variety of symptoms in poultry. Some of these include haemorrhaging, pseudo-rickets, fatty liver, encephalomalacia and excudates. In addition poor growth, poor feed efficiency and mortality have been experienced [1].

Commercial poultry feeds are found to be invariably contaminated with aflatoxins [2-3]. The most commonly infected ingredients are corn gluten, corn and cotton seed cake [4]. Contaminated feed coupled with poor management practices has led to great economical losses to commercial poultry raiser.

Inactivation of aflatoxin in cotton seed and peanut meals by ammoniation was reported by Dollear and Gardner [5]. Goldblatt [6] reported after biological tests that the treated meal was free from toxicity. Gardner *et. al.* [7] conducted large scale tests to eliminate aflatoxins by ammoniation.

The present studies were initiated to determine the effectiveness of ammoniation as a means of inactivation aflatoxins occurring naturally in contaminated feeds. This paper reports the analytical and haematological aspects of the investigation.

MATERIALS AND METHODS

One day-old broiler chickens (Hubbard strain) of mixed sex (120) were procured from a local hatchery. All the chicks were randomly divided into 12 experimental units having 10 birds in each. Completely randomised design was used in this study.

Four experimental rations *viz.* A, B, C and D were formulated and mixed. Ration A served as control, ration B

contained control ammoniated, ration C contained contaminated feed (500 µg/kg) and ration D contained decontaminated feed and ration D contained decontaminated feed respectively (Table 1). Poultry feed was screened for aflatoxin and it was further mixed with contaminated rice to a specific aflatoxin level (500 ppb). The feed was treated with aqueous ammonia and fed to the birds. Decontamination procedure are reported elsewhere.

Experimental room was partitioned into 12 experimental units with wirenetting. Experimental room was disinfected before initiation of the experiment. Wheat straw was used as a litter material. Temperature of the experimental room was maintained at 35°, 32°, 29° and 26° in the first, second, third and fourth week respectively and 23° temperature was maintained during remaining period. Electric heater was used for heating purpose. Continuous light was provided to the chicks all the time.

Fresh water and feed was made available to the chicks *ad libitum*. The study was extended over a period of 8 weeks.

The data collected were subjected analysis of variance and Duncan's Multiple Range test was applied for the comparison of treatment means.

RESULTS AND DISCUSSION

The effect of feeding detoxified feed to chicks on certain blood pictures were studied and the results are presented in Table 2. The haemoglobin (Hb) content of the birds fed on detoxified feed was the same as that of the control. Since Hb is related to proteins production by the liver, the values suggest that the liver function was quite normal and no effect of toxicity could be traced. This indicated that the detoxified feed has no toxic effect on the liver function. RBC (red blood cells) and WBC (white blood cells) changed proportionately as indicated in Table 2.

Table 1. Composition of experimental rations

Ingredients	Rations			
	A Control	B Control ammonia- ated	C Contami- nated	D Contami- nated
Maize	15.00	15.00	15.00	15.00
Wheat	17.00	17.00	17.00	17.00
Rice	14.00	14.00	13.00	13.00
Rice polishings	8.00	8.00	8.00	8.00
Sesame meal	10.00	10.00	7.00	7.00
Cotton seed cake (decorticated)	8.00	8.00	8.00	8.00
Corn gluten meal (60%)	-	-	8.00	8.00
Contaminated with aflatoxin				
Corn gluten meal (30%) with aflato- xin contamination	-	-	4.00	4.00
Corn gluten meal (60%) normal	8.00	8.00	-	-
Blood meal	2.00	2.00	2.00	2.00
Fish meal	11.00	11.00	11.00	11.00
Molasses (cane)	3.00	3.00	3.00	3.00
Bone meal	0.50	0.50	0.50	0.50
Limestone	1.00	1.00	1.00	1.00
Vegetable oil	2.00	2.00	2.00	2.00
Vitamin-mineral premix	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00
Crude protein %	24.00	24.00	24.00	24.00
Metabolizable energy Kcal/kg	3000.00	3000.00	3000.00	3000.00

Table 2. Average values of haemoglobin (Hb), red blood cell (RBC) and white blood cells (WBC) in blood

Description	A Control	B Control	C Contami- nated	D de-conta- minated
Haemoglobin gm/10 ml	13.17±0.69	12.48±0.42	13.13±0.76	12.63±0.73
Red blood cells 10 ⁶ /cc	2.15±0.22	2.38±0.63	2.30±0.70	2.71±0.67
White blood cell 10 ⁶ /cc	16.50±4.87	16.83±2.45	17.50±3.55	20.00±3.95

Mortality. Maximum mortality percentage was observed in case of the chicks receiving ration C (contaminated) and minimum when ration B was fed (ammoniated control). Mortality in chicks of group C occurred during early stages. It is evident from the data that ammoniation helped in lowering down the mortality rate thus indicating the destruction of aflatoxins.

Dressing percentage. Average dressing percentage of the chicks is reported in Table 3. Highly significant difference at P<0.01 were observed when the data were subjected to analysis of variance. Dressing percentage trend was comparable with the weight gain and feed efficiency value.

Visceral organs. Livers with similar weight were observed in ration A, B and D (Table 3). Suggesting thereby that the detoxified feed was comparable with control i.e. it was non-toxic. Colour of the livers was normal in case of chicks fed on ration A and D but spots were detected on livers of the chicks fed on contaminated feed C. Tung *et al.*

Table 3. Average weight gain, feed consumption, feed efficiency, mortality, dressing percentage and weight of internal organs.

Particulars	Rations			
	A Control	B Control contami- nated	C Contami- nated	D Deconta- minated
No. of chicks	30	30	30	30
Days on experiment	56	56	56	56
Average initial weight/chicks (gm)	45	45	45	45
Average final weight/chick (gm)	1686	1961	1390	1779
Average total weight gained/ chick (gm)*	1641±110	1916±196	1345±190	1734±142
Average total feed consumption/ chick (gm)*	4713±59	4855±84	4840±32	4944±81
Average total feed efficiency*	2.87±0.11	2.53±0.081	3.59±0.81	2.85±0.39
Average mortality (%)	10.00±2.06	6.66±1.85	30.00±3.10	13.33±1.88
Average dressing percentage	53.00±1.73	57.00±2.11	53.00±1.94	55.00±1.43
Visceral organs % of the body weight				
(a) Livers**	2.90±0.48	2.92±0.35	4.15±0.53	2.95±0.37
(b) Heart	0.77±0.12	0.74±0.12	0.86±0.19	0.77±0.05

* Significant at 5% level, ** Significant at 1% level

[12, 13] reported haemorrhagic spots on the livers of the chicks fed on contaminated feeds. Impaired blood coagulation during aflatoxicosis seem to be involved in the occurrence of haemorrhages [14]. Statistically there was significant differences among various treatment means at $P < 0.1$ in respect of liver weights.

Heart. Heart weight of chicks of group C (contaminated) was lower than other chicks. Statistical analysis revealed non-significant differences among various treatment means except in case of contaminated feed.

General performance. Average weight gained by the chicks fed on ration A (control), B (control ammoniated), C (contaminated) and D (detoxified) are shown in Table 3. Aflatoxin contaminated feed after ammoniation gave better results in respect of weight gain than other rations. Lower weight gain was observed when contaminated rations were fed. Ammoniation of the feeds (control as well as contaminated) seems to improve the nutritive value of the feed as is evident by the weight gain results. Significant differences at $P < 0.5$ were observed in respect of weight gain data when subjected to analysis of variance.

Feed consumption. Average feed consumed by the chicks fed on rations A, B, C and D are presented in Table 3. Maximum feed was consumed by the chicks receiving ration D and minimum was by ration A. Statistical analysis revealed highly significant difference at $P < 0.5$ when the data were subjected to analysis of variance.

Feed efficiency. Feed efficiency values were higher in ration B which was ammoniated control and lower in feed C (contaminated). Feed efficiency value of ration D was comparable with the control. There was a highly significant

difference at $P < 0.01$ when the data were subjected to analysis of variance (Table 3). Results indicated that ammoniation of feeds improved the feed efficiency.

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