

BIO-MIX HELPS IN GROWTH PERFORMANCE IN BROILER CHICKENS HAVING MYCOTOXICOSIS

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Abstract

Bio-Mix (a herbal extract of A.B. Pharma) was used to control experimentally induced mycotoxicosis in broiler chicks. For this purpose the chicks were divided into three groups X, Y and Z. Each group was comprised of 30 chicks. Group X and Y were fed on mycotoxin-contaminated feed for 12 days. While group Z was kept as control. From the next day, the chicks of group Y were treated with Bio-Mix @100g/50 Kg feed for 11 days. The chicks were kept under observation. It was noted that there was loose dropping and less feed intake in group Y as compared to group X and Z. In order to obtain the live body weight 10 chicks from each group were randomly weighed from each group weekly. The weight record showed that in group Y the growth rate was significant lower than group X and Z.

Key words: Aflatoxicosis, mycotoxicosis, poultry.

INTRODUCTION

Economic losses in livestock industry due to mycotoxin contamination of feedstuffs have been estimated in millions of dollars [Barney 1998]. In most field cases mycotoxincosis involve low-level chronic intake of fungal metabolites resulting in a measurable decline in performance together with non-specific changes such as immunosuppression and sub-cutaneous hemorrhages in broilers [Shane 1999]. The most important mycotoxins found in poultry feed are ranked by Hesseltive (1986) which are:-

Ablatoxin	hepatotoxin
Ochratoxin	nephrotoxin
Trichothecens	dermatotoxin
Zearalenone	estrogen
Deoxnivalenol	dermatotoxin

[Holer and D-Huls 1999].

Among these toxins the most dangerous one is aflatoxin, which commonly attack on young chicks and mortality ranges from 10% to 50%. Aflatoxin produces a

variety of clinical lesions in poultry. Chronic low-level exposure to aflatoxin causes an increase in the size of liver, kidney and spleen with the liver becoming friable, pale in color and extremely fatty with increasing severity of the out-break [Jordan 1990]. Broiler chickens are also highly susceptible to ochratoxin that is extremely pathogenic at dietary levels exceeding 0.3 ppm. The kidney is special target organ of ochratoxins [Shane 1999].

It causes three-fold increase in mortality and impaired cell-mediated immunity. It also reduces the weight gained, feed uptake and growth rate [Younus1994]. Prevention and control of mycotoxicosis with specific emphasis on the contemporary poultry industry is dependent upon the adherence to several management techniques. Among the most important ones are methionine supplementation liquid extraction, heat, treatment, irradiation techniques and feed additives. In this experiment we used a feed additive Bio-Mix composed of *Tinospora cordifolia* based multiherb extract.

MATERIALS AND METHODS

The present study was conducted at NIAB Faisalabad using ninety chicks of one-day age to investigate the impact of Bio-Mix in the chicks suffering from mycotoxicosis. The chicks were randomly divided into 3 experimental groups X, Y and Z. On a daily basis measured quantity of feed and ad libitum water was supplied to each group. The chicks were also vaccinated against ND, IBD and Hydropericardium diseases as per schedule. After 21 days the chicks of group X and Y were intoxicated by giving them feed that had almost all the important mycotoxins for 12 days. Before the experiment the fungus was grown in feedstuff. These feed samples were sent to Bio-min Laboratory Singapore for mycotoxin analysis. At the age of 22 days the birds of group X were treated with Bio-Mix by mixing it in the feed @ 2gm kg⁻¹ feed for 11 days. Feed without mycotoxins was served as control group Z, also no Bio-Mix treatment was given to group Y and Z. The chicks were kept under observation during the whole experimental period. Their behavioral response and dropping conditions were monitored. The feed intake by all the experimental groups was recorded by giving them calculated amount of feed daily and subtracting the waste feed. Weekly live body weight (kg) of individual birds was recorded from the start to the end of experiment in order to calculate the mean body weight per group. From the start to end of experiment, a measured and equal quantity of feed was provided to all experimental groups by subtracting discarded feed from total daily feed in order to calculate the weekly feed intake. The data of all the experimental groups was tested by application of analysis of variance and differences in various treatment groups were determined by using LSD test at (P<0.05).

RESULTS

The results of feed analysis show that the poisoned feed served to group X and Y had almost all the important toxins such as aflatoxin, T-2 toxin, diacetoxyscripenol, deoxynivalenol, nivalenol, zearalenon, ochratoxin etc. at high level. The results of feed analysis are shown in Table 1. In this case sample No. 4 was given to group X and Y during the experimental period for the administration of disease. The 1st three samples that have very low level of these

toxins was served to control birds. The performance of the birds belonging to different treatment groups was different. Group X in which the birds were treated with Bio-Mix along the intoxication with poisoned feed indicated little loose dropping. Birds were apparently healthy, neat and clean. Feed intake was normal and active like those of control birds, while in the diseased birds of group Y, where no Bio-Mix treatment was given, loose dropping or paste the maximum. Additionally, feed intake was slow although they ate complete feed. In this group, birds were drowsy and lethargic, feathers were dirty due to paste and ruffled and comb was pale yellow when compared with control birds.

The statistical analysis of feed showed no significant difference in feed intake in all groups although it was observed that the feed uptake was slow in diseased birds (group Y) as compared to treated and control birds (X and Z groups). The results of feed intake in three groups are shown in Table 2.

Live body weight of the chickens was also recorded weekly throughout the experimental tenure. The results in Table 3 show that before the administration of poisoned feed up to the age of 22 day, the live body weight of the chicks remained the same in all the experimental groups that was 153g at the age of 8 days, 356 g on approaching 15th day and 754 g when the chicks were of 22 days old. Then the mean body weight was found to be significantly ($P < 0.01$) affected by mycotoxicosis in the diseased birds. Comparison of the means showed significantly lowered body weight by the birds of group Y.

Table 1: Levels of Mycotoxins in feed ($\mu\text{g kg}^{-1}$) fed to the experimental chickens.

Mycotoxin	Sample. No. 1	Sample. No.2	Sample. No. 3	Sample. No. 4
Aflatoxin B1	18	12	25	70
Aflatoxin B2	6	9	7	65
T-2 toxin	85	60	78	600
HT -2 toxin	105	95	70	540
Diacetoxyscripenol	150	165	124	515
Deoxynivalenol	480	230	165	1250
Acetyle-deoxynivalenol	270	245	238	1460
Nivalenol	280	239	274	1230
Fumonisin	1240	1149	1292	>4000
Zearalenon	150	132	95	426
Ochratoxin-A	14	21	35	93

Table 2: Feed intake in group X, Y and Z (Kg).

Age (days)	Group X	Group Y	Group Z	Prob.
8	10.5 \pm 0.09	10.5 \pm 0.12	10.5 \pm 1.01	NS
15	13.0 \pm 0.62	13.0 \pm 1.00	13.0 \pm 0.28	NS
22	19.7 \pm 0.51	19.7 \pm 0.59	20.0 \pm 0.61	NS
30	23.6 \pm 0.92	20.0 \pm 1.14	23.5 \pm 1.33	NS
36	15.0 \pm 1.11	12.0 \pm 0.26	15.0 \pm 1.02	NS
43	14.0 \pm 0.99	13.5 \pm 0.90	14.0 \pm 0.80	NS

Table 3: Growth rate of group X, Y and Z (g).

Age (days)	Group X	Group Y	Group Z	Prob.
08	151.0 \pm 1.73	153.7 \pm 3.21	155.0 \pm 5.00	NS
15	356.7 \pm 5.77	356.0 \pm 10.15	356.3 \pm 5.51	NS
22	755.0 \pm 5.00	754.0 \pm 6.93	751.3 \pm 3.21	NS
29	1048.3 \pm 27.54	983.7 \pm 7.77	1035.0 \pm 21.79	0.0045**
36	1410.7 \pm 10.07	1373.3 \pm 10.42	1398.3 \pm 7.64	0.0078**
43	1920.0 \pm 12.11	1850.0 \pm 3.21	1910 \pm 11.89	0.0054**

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

DISCUSSION

The birds of group X and Y were intoxicated with mycotoxin contaminated feed. Almost all the major toxins were given to the chicks in high doses as shown in the results. More than one mycotoxins in association had more drastic effects on the chickens than their individual effects [Shane 1999]. It was also found that mycotoxins induce negative effects on the growth of the chickens even when they are in trace amounts.

In group Y loose dropping and paste were at their maximum. The birds were drowsy having dirty ruffled feathers; feed intake was also slow in the intoxicated birds. Mycotoxins adversely affect the performance of the birds. Khan *et al.* [1990] also noted six percent less feed intake for every milligram (ppm) of toxins. Abnormal feathering in the birds was due to disturbance in protein synthesis [Shane 1999]. Enteritis due to mycotoxins was also reported by Balachandran *et al.* [1998]. In contrast, mycotoxin induced birds that were treated with Bio-Mix were healthy, having no loose dropping. The condition of these birds was even better than the control birds.

An equal amount of feed was provided to all experimental chicks on daily basis. The contaminated feed was administered to group X and Y. It was observed that the birds in group X and Z consumed their meal efficiently, while chicks of group Y took a long time to complete their feed (more than 30min.). It was due to the fact that mycotoxins adversely affect the feed intake due to the loss of appetite and feed conversion efficiency [Peerzada *et al.* 2000].

Weekly weight gain accounts indicated that before the administration of mycotoxins, no significant difference was observed in the live body weight of all the three experimental groups up to 22 days. After mycotoxicosis challenge, the growth rate was significantly ($P < 0.01$, 6.93) decreased in the birds of group Y (Table 3). No significant difference in the body weight of group X and Z was observed during the experimental period. This decrease in body weight was resulted due to the decreased feed utilization and feed conversion efficiency [Rizvi *et al.* 1992].

The results confirmed that Bio-Mix could effectively detoxify mycotoxins *in vivo*. The safety aspects of Bio-Mix are that it is used at low level e.g. 2% per kg feed. It also provides improvement in the performance of broilers.

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