EFFECTS OF *EMBLICA OFFICINALIS* AS A FEED ADDITIVE IN BROILER CHICKS *

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Abstract

The effect of Emblica officinalis in ameliorating the toxic effect of aflatoxin in broiler chicken was assessed in the present study. Aflatoxin decreases feed intake and feed efficiency. It also affects gain in body weight, which is very important in rearing of broiler chicken. These toxic effects could be reduced by the incorporation of amla in the feed, as evidenced by the improved feed intake, feed efficiency and body weight gain seen in amla fed birds.

Key words: *Emblica officinalis, amla, aflatoxin*

Broiler farming is now properly recognized as an organized and scientifically based industry with tremendous employment potential. Small initial investment, availability of quality chicks, short generation interval, quick and assured returns compared to other livestock species and poultry's social role as a tool to overcome poverty and malnutrition are some of the factors which favours the growth of this industry. Feeding constitutes the fundamental and major managemental concern in poultry production since the major expenditure (60 to70%) in poultry raising is feed cost. Feeding efficiency therefore is one of the key factors involved in successful poultry production. Toxic contamination of feed especially by mycotoxins is a common problem that could affect the general health and production performance of poultry. These in turn when present as residues in edible tissues may prove hazardous to human beings. *Emblica officinalis* commonly called as amla is extensively used in Indian medicines. It is a major ingredient in Chyavanaprash and other preparations used as health tonic (Ojha *et al.*, 1975). The present study was designed to assess the efficacy of *Emblica officinalis* as a feed additive which can reduce the toxic effects of mycotoxins in poultry feed.

Materials and Methods

Fifty four, healthy day old Hubbard broiler chicks were procured from Krishna Hatche ries, Thrissur, Kerala. The chicks were randomly divided into three groups each having two replicates. All the six replicate groups were kept in separate pens under deep litter system throughout the experiment. Ideal brooding conditions were provided for the first four weeks. Each group was given scheduled experimental feed and water *ad libitum*. The experiment was conducted at the Centre of Excellence in Pathology, College of Veterinary and Animal Sciences, Mannuthy, during the period from February to April, 2002. Commercial broiler feeds, both starter and finisher were procured from the market. Amla powder prepared from sun dried fruits of *Emblica officinalis* was purchased from an ayurvedic shop. All the three groups of birds were fed as per the following schedule.

Group I – Birds of the control group were given commercial feed alone.

**Part of M.V.Sc. thesis submitted by the first author to the Kerala Agricultural University, Thrissur*

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Group II – Amla powder was added at 1% level in the feed.

Group III - Amla powder was added at 2% level in the feed.

The birds were reared for eight weeks. They were sacrificed at the end of the experiment. Body weights of the chicks at day-old were recorded, before the commencement of the experiment and thereafter at fortnightly intervals in all the groups.

Total feed intake of the control and experimental birds were recorded. The Feed Conversion Ratio (FCR) was calculated based on the mean body weight and cumulative feed intake, at the end of the experiment.

$$FCR = \frac{\text{Cumulative feed intake}}{\text{Mean body weight}}$$

Standard methods (AOAC, 1990) were followed to estimate the chemical composition of the feeds. Feed samples were assayed for the presence of aflatoxin and ochratoxin by multimycotoxin analysis method (Tapia, 1985) using thin layer chromatography.

The data obtained from various parameters were subjected to statistical analysis and analysis of variance (ANOVA) was conducted as per Rangaswamy (1995).

Results and Discussion

The mean body weights recorded at fortnightly intervals are presented in Table1. The birds in all the groups showed a gradual increase in body weight throughout the experimental period. The mean body weights of the three groups were not significantly different upto the second week. Thereafter, an increase in the weight was seen in the amla treated groups compared to the control group. A significant difference ($P<0.05$) was noted between groups I and III at fourth week of age. However at eighth week, significant differences ($P<0.05$) were observed between all the three groups.

Table 1. Mean body weight ±SE (g) of the experimental birds at fortnightly intervals

Group	Amla Level (%)	Day old	Second week	Fourth week	Sixth week	Eighth week
I	0	45.67 ^{a} ±0.8	373.11^{a} ±2.38	1053.33^{a} ±28.82	1994.44 ^{a} ±53	2250.0^{a} ±45.69
II	1	46.00^{a} ±0.83	374.78^{a} ±2.45	1116.67 ^{a} ±37.27	2105.56 ^{a} ±59.19	2446.43 ^{b} ±65.14
III	2	45.78^{a} ±0.97	377.56^{a} ±1.88	1230.0^{b} ±37.97	2194.44 ^{b} ±47.47	2782.14^{c} ±57.08
	LSD	2.5	5.6	102	155.2	161.7

Means bearing the same superscript within a column does not differ significantly($P<0.05$)

The total feed intake upto eight weeks of age and the FCR values at the end of experiment are presented in Table 2. The FCR was found to be better in the amla fed birds compared to the control group.

Table 2. Total feed consumption and Feed Conversion Ratio (FCR) of the birds at eight weeks of age

Group	Amla level (%)	Feed Consumption (kg)	FCR
I	0	130	3.21
II	1	136	3.09
III	2	138	2.76

Proximate analysis of the feed used indicated normal chemical composition. Analysis of the aflatoxin content of the feed revealed an average of 100 to 150 ppb of aflatoxin B1 in the starter rations and 150 to 200 ppb in the finisher rations. Ochratoxin content was nil in all the samples.

The results indicated a reduction in weight gain and FCR in control group birds. Reductions in weight gain and feed efficiency were considered to be the most sensitive indicators in aflatoxicosis (Armbrecht *et al.*, 1971). Reduction in feed intake was prominent by the fourth week of age (Vasan *et al.*, 1998). The reduction in feed intake may be due to toxic injury inflicted by aflatoxin on the alimentary system, especially the liver, leading to reduced appetite, poor metabolism

and lowered absorption of nutrients as reported by Hamilton (1989). *Emblica officinalis* reduced the toxic injury, which is evident by the increase in feed intake and improved feed efficiency in the amla fed groups. Similar findings were reported by Gulati *et al.* (1995), where *Emblica officinalis* and quercetin isolated from it improved feed intake which was decreased following alcohol intoxication in rats. The reduction in body weight gain observed in control group birds may be due to decrease in appetite and reduced feed utilization induced by the toxin. The higher body weight observed in amla fed birds may be due to the ameliorating effect of *Emblica officinalis* resulting in increased feed intake and improved feed efficiency.

The incidence of aflatoxin contamination in the commercial livestock feed available in Kerala is very high. The hot and humid climatic conditions along with poor storage conditions are all conducive to fungal growth. It is also reported that aflatoxicosis is not solely a storage problem. Aflatoxin may be produced in growing crops before harvest. Hence, it is rather impossible to maintain poultry or any other livestock with a feed totally free from aflatoxin. Rajan *et al.* (1991) reported that 50.1 per cent of the feed samples available in the market of Kerala are contaminated with aflatoxin. Arulmozhi (1999) also reported that 24 per cent of the poultry feed samples available in the markets of Kerala were contaminated with toxic levels of aflatoxin ranging from 20 to 200 ppb. Aflatoxin reduces feed intake, feed efficiency and thereby lowers body weight gain in poultry. This affects the production performance of broiler birds which is very important in successful broiler farming and thus reduces the returns from this enterprise. Presence of aflatoxins in the foods of animal origin and the subsequent human exposure is also of great concern. The toxin may be excreted through egg or meat in a chemically modified form or may be present in various tissues especially liver in a chemically unchanged form, where it remains as residue. In both the situations, human beings are at the risk of contracting toxicosis. The present study has made clear that *Emblica officinalis* could limit the toxic changes induced by aflatoxin which is evident from the better feed efficiency and body weight gain seen in amla fed birds. Hence, it could be used as an effective feed additive in the livestock feed.

Acknowledgements

The authors are thankful to the Dean, College of Veterinary and Animal Sciences, Mannuthy for providing the facilities required for the study and to the Shaji's Viswanath Pharmacy, Ernakulam for supplying good quality amla powder.

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