

Research Article

Ameliorative Efficacy of Stresroak in Induced Aflatoxicosis in Broilers: A Haematological Study

Pravin Rathod^{1*}, Govind Gangane², Nagnath Bhojane¹, Mohini Khodke¹, and Mayura Gole¹

¹Post Graduate Institute of Veterinary And Animal Sciences, Opposite of Dr. PDKV, Murtijapur Road, Akola 444104

²College of Veterinary & Animal Sciences, MAU Campus, Parbhani - 431402

Abstract

Experimental study in 90 day old broilers was undertaken by dividing them into three groups having thirty chicks in each group by feeding them with dietary AflatoxinB1 @ dose of 100 ppb in groups II and 100 ppb + Stresroak @ 1gm/kg of feed in group III and without aflatoxin in the feed serve as control I for a period of 45 days. The haematological study revealed that values of haemoglobin were 12.10±0.62, 10.0±0.44, 10.98±0.14 g/dl, total erythrocyte count 3.90±0.10, 3.33±0.04, 3.62±0.05 x 10⁶/mm³, total leukocyte count 24.96±0.50, 22.10±0.69, 23.0±0.94 x 10³/mm³ in the groups I, II & III respectively. Haemoglobin, total erythrocyte count, total leukocyte count values showed that significant decreased and at par values (P < 0.01) in groups II and III as compared with control group I. Thus from above observations it was concluded that dietary aflatoxin @ dose of 100 ppb fed birds had adverse effect on haematological values which results into economical losses to farmers, consumers, animal products & Stresroak fed with aflatoxin @ dose of 100 ppb showed ameliorative effect on haematological values in broiler chickens.

Keywords: Stresroak, AflatoxinB1, Broilers, Haematology

*Correspondence

Author: Pravin Rathod

Email: nagnathbhojane@gmail.com

Introduction

Aflatoxin B1 is a hepatotoxic, food born mycotoxin, mainly produced by the fungi *Aspergillus parasiticus* and *Aspergillus flavus*. Due to its long serum half life it accumulates in the food chain, and threatens livestock & poultry industry because of its widespread occurrence, toxicity and the residual effect in animal product & by products. The toxicity of the Aflatoxin B1 is characterized by its hepatotoxic, immunosuppressive, carcinogenic, mutagenic & teratogenic effects. Since aflatoxin B1 is a common contaminants of feed ingredients and causes severe economic losses to the livestock, poultry & human sector by reduced growth rate, feed contamination & poor feed conversion ratio, increased mortality & immunosuppression [1]. Anything, which disrupts physiological and psychological stability of chickens, is a stressor and the reaction to the stressor is termed as stress. Diseases challenged by viruses, bacteria, parasites and toxic compounds such as mycotoxin are common form of stress in poultry. Moreover, the biological effects of aflatoxin B1 in term of anaemia, hypoproteinemia & hypoglycemia alter the normal homeostasis which helps to investigate deleterious effects of aflatoxicosis on haemato-biochemical parameters in broilers [2]. Among the entire factors, aflatoxin is an important common stressor in poultry, which ultimately results in poor production and growth.

Aflatoxin also increases the exposure to disease causing organism. With increased moisture in the feed ingredient utilization efficiency is decreased. Polyherbal formulation Stresroak (M/s Ayurved Ltd. Baddi, India) is scientifically proven to be immunomodulatory, free radical scavenging and antioxidant rejuvenating actions. The Present experiment was designed to study the efficacy of polyherbal product in counteracting overcrowding stress among commercial broiler chicken. Therefore, the present work was undertaken to study the effect of aflatoxinB1 on haematobiochemical profile in broiler chickens and to investigate the possible preventive effect of Stresroak a commercially available antistressor herbal preparation against aflatoxicosis.

Materials and Methods

Mycotoxin production

Culture of *Aspergillus flavus* (MTCC 2798) obtained from Institute of Microbial Technology (IMTECH), Chandigarh, were inoculated on Czapeck Dox Agar and Sabaraud's Dextrose Agar slants and incubated at 28°C for 7 days separately. This aflatoxin cultures were inoculated on rice and wheat for the production of aflatoxin as described method of [3].

Experimental birds

Day-old 'Vencobb- 300' broiler chicks procured from reputed hatchery. The birds were weighted individually and reared in deep litter system under optimum conditions of brooding and management.

Experimental feed

Broilers starter (21% crude protein, 2800 metabolic energy) and finisher (20% crude protein, 2900 metabolic energy) rations, procured from local market and tested to be mycotoxin free, were offered to broiler chicks from 0 - 21st day and 22 - 45th day of age, respectively. Chicks were provided feed and fresh *ad-libitum* feed and fresh drinking water throughout the experiment to all groups. Group II fed aflatoxinB1 was incorporated in the normal feed @ dose of 100 ppb. Group III fed aflatoxinB1 @ dose of 100 ppb & Stresroak @ 1gm/kg of feed.

Experimental procedure

A total of ninety, day-old chicks, were randomly divided into three dietary treatment groups each containing 30 chicks. The group I represent healthy control birds, fed with normal diet. The birds in groups II and III were fed with aflatoxin @ 100 ppb and aflatoxin @ 100 ppb + Stresroak @ 1gm/kg of feed respectively.

Haematology

Ten birds from each group were sacrificed on 15th, 30th and 45th days of the experiment. Prior to sacrifice, blood was collected in heparinized vials by cardiac puncture for haemato-biochemical studies. The haemoglobin (Hb, Sahli's acid haematin methods), packed cell volume (PCV, Microhaematocrit method), total erythrocyte count (TEC, Neubaur's chamber), total leucocyte count (TLC, Neubaur's chamber) & differential leucocyte count (DLC, Wright's stain) estimations were carried out [4].

Statistical analysis

The Data was analysed statistically [5]. The probability $P < 0.01$ was accepted as significant.

Result and Discussion

Haematological changes

Average haematological values in broiler chicks of various experimental groups observed at 15th, 30th and 45th days of experiment are presented in **Table 1**. The mean values of Hb and TEC were significantly reduced at all intervals in groups II and at par in group III chicks as compared with that of the controls. Except in groups II the mean values of TLC at the intervals of 15th days was not significant as compared to control but the mean values at 30th and 45th days were significant as compared to control group I. It indicated that aflatoxin treated chicks developed anaemia, [6]. Reduction in haemoglobin concentration during in aflatoxicated fed birds observed in the present in the study was in accordance with the reports of earlier workers [7]. Aflatoxin mainly inhibits protein synthesis and even a very low level of aflatoxinB1 @ 100 ppb was reported to cause significant decrease in the haemoglobin concentration during a period of 45 days in broilers. The reduction in haemoglobin concentration during aflatoxicosis could be due to impaired iron absorption combined with suppression of haematopoiesis [7]. Earlier, [8] reported similar results indicating an aflatoxicated induced microcytic hypochromic anaemia. Reduction in total leucocytic count in aflatoxicosis was almost in agreement with several previous reports those of [9] who observed leucocytopenia in broilers at relatively lower level of aflatoxicosis @ 100 ppb than used in the present study. Stresroak was a herbal

antistressor, immunomodulator and performance enhancer that can improve broiler flock performance it revealed that non significant alteration in group III as compared to control group I & group II [10, 11].

Table 1 Haematological values (Mean+SE) in experimental chicks of different groups at various intervals

| Parameters | Intervals (days) | I | II | III | CD |
|-----------------------------------|----------------------|----------------------------|-----------------------------|------------------------------|-------------|
| Haemoglobin (g/dl) | 15 th day | 8.40 ^a ± 0.20 | 7.47 ^{a b} ± 0.21 | 8.40 ^a ± 0.48 | 0.96 |
| | 30 th day | 10.30 ^a ± 0.30 | 8.42 ^b ± 0.12 | 9.35 ^c ± 0.25 | 0.65 |
| | 45 th day | 12.10 ^a ± 0.62 | 10.0 ^{b c} ± 0.44 | 10.98 ^c ± 0.14 | 1.13 |
| TEC (X10⁶ cumm) | 15 th day | 3.80 ^{a c} ± 0.13 | 3.29 ^{b c} ± 0.12 | 3.53 ^c ± 0.18 | 0.40 |
| | 30 th day | 4.20 ^a ± 0.36 | 3.24 ^{b c} ± 0.11 | 3.79 ^{a b c} ± 0.31 | 0.68 |
| | 45 th day | 3.90 ^a ± 0.10 | 3.33 ^b ± 0.04 | 3.62 ^{a b} ± 0.05 | 0.31 |
| TLC (X10³ cumm) | 15 th day | 21.02 ^a ± 1.60 | 18.90 ^{abc} ± 0.50 | 20.0 ^{ac} ± 0.56 | 2.76 |
| | 30 th day | 22.43 ^{ac} ± 0.80 | 20.09 ^{bc} ± 0.45 | 22.12 ^{ac} ± 0.33 | 1.69 |
| | 45 th day | 24.96 ^{ac} ± 0.50 | 22.10 ^{bc} ± 0.69 | 23.0 ^c ± 0.94 | 1.98 |

Mean bearing different superscripts shows significant differences between the groups among the rows (P<0.01).

Conclusion

Aflatoxin depresses the overall growth and performance of the chicken. Supplementation of polyherbal formulation Stresroak in basal diet improved growth and performance parameters viz. body weight and FCR. Serum biochemical and haematological parameters were normalized after the polyherbal treatment. It can be concluded that the product Stresroak can be used in the amelioration of aflatoxicity in poultry.

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