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Effect of dietary aflatoxin B_1 on haemato-biochemical profile in laying hen*

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Adult White Leghorn layer birds (40) obtained from a commercial farm were divided randomly into 2 groups of 20 each and reared separately in deep litter system with standard feed and water. Powdered aflatoxin B_1 produced in the laboratory was added in ration to achieve 0.5 ppm level of toxin (AF group) and control group received normal toxin free diet for 60 days. Jugular blood samples were collected from 5 birds of each group on 0, 15th, 30th, 45th and 60th day of experiment for haematological studies by conventional methods.

The separated sera were used for estimation of total serum protein, serum albumin, cholesterol, alkaline phosphatase, aspartate aminotransferase, alanine aminotransferase, uric acid and creatinine by using semi-automated analyzer with diagnostic kits and standard methodology. Data obtained were analyzed by one-way analysis of variance (ANOVA) (Snedecor and Cochran 1994). The t-test (2 samples assuming equal variance) was calculated along with the critical difference (CD) under each parameter.

Aflatoxin B_1 treated birds showed significant ($P<0.01$) decrease in TEC (2.56 ± 0.01), Hb (8.57 ± 0.09) and PCV (29.40 ± 0.35) than that in control birds TEC (2.70±0.03), Hb (8.96±0.11) and PCV (30.68±0.38), which confirmed the reports of Basheer Ahamad *et al.* (2006) and Singh *et al.* (1992). There were no significant differences in TLC and DLC between treated and control birds.

The decrease in PCV, Hb and TEC suggested anaemia in the toxicated birds, resulted from toxic depression of a haemopoietic system by aflatoxin as also reported by Oguz *et al.* (2000). Tung *et al.* (1975) suggested that anaemia could result from reduced and defective haematopoiesis, increased destruction of red blood cells or cumulative effect of these factors. Aflatoxin B_1 treated birds had a significant ($P<0.01$) decrease in TSP (4.47 ± 0.16), albumin (2.14 ± 0.10) and cholesterol (104.20 ± 2.93) as compared with values of control group (TSP, 5.91 ± 0.14; albumin, 2.53 ± 0.05 and cholesterol, 133.90 ± 1.77) which confirmed the reports of Smith *et al.* (1992) and Basheer Ahamad *et al.* (2006). A significant and gradual downfall in the level of TSP, albumin at 0.5 ppm (Bhanuprakash *et al.* (2006) and cholesterol at 0.7 ppm of dietary aflatoxin was observed by Johri and Beura (2000).

In the present study, decrease in the level of TSP and albumin could possibly be due to impairment of the protein synthesis and loss of protein and albumin due to progressive and persistent damage of hepatic parenchyma as also reported by Srivastava (1984) and Mezey 1978).

A highly significant ($P<0.01$) increased activity of serum AST (190.89 ± 2.28), ALT (8.50 ± 0.50), ALP (487.74 ± 1.83) was observed in toxin fed group (AF group) as compared to serum AST (164.23 ± 2.34), ALT (5.38 ± 0.25) and ALP (479.9± 1.58) of control group birds. Similarly, Arshad *et al.* (1993) reported significant and dose dependant increase in AST and ALT activity in aflatoxicosis. Elevation of one or more enzymes (AST, ALT and ALP) was also reported in aflatoxicosis (Raina *et al.* 1991). The elevation of AST, ALT and ALP activity could be attributed to circulatory and degenerative changes in liver and kidney followed by subsequent release in the blood circulation (Raina *et al.*1991).

Serum creatinine (2.67±0.18) and uric acid (7.41±0.36) level significantly ($P<0.01$) increased in the birds of AF group as compared to serum creatinine (1.60±0.05) and uric acid (5.55±0.30) level of control birds, which confirmed the reports of Sakhare (2001). Increased level of creatinine and uric acid might be due to accelerated rate of protein catabolism.

SUMMARY

Effect of dietary aflatoxin B_1 on haemato-biochemical profile was studied in laying hen. Aflatoxin B_1 treated birds showed significant decrease in TEC, Hb and PCV. There was no significant difference in TLC and DLC between treated

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and control birds. TSP, albumin and cholestoral showed decline in treated birds. Serum AST, ALT, ALP activity increased in treated birds. Creatinine and uric acid level also increased.

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