Hepatoprotective Effect of Alloe Health Drink in Broiler Chicken

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Abstract
Aflatoxicosis was induced in commercial broiler chicken by administering 0.25 and 0.5ppm of aflatoxin through feed. The birds were concurrently treated with alloe health drink, a commercial preparation at 1 and 2 per cent level through drinking water. Aflatoxin (0.5 ppm) induced reduction in serum antioxidant enzymes and histopathological changes in liver were reversed to near normal by supplementation of alloe health drink at 2 per cent level.

Key words: Alloe health drink, Hepatoprotection, Antioxidant assay, Broiler chicken

Aloe vera has immense potential as a natural healing agent and used for its antibacterial, antiseptic, anti-inflammatory and immunomodulatory properties. Aqueous extract of A. vera has been reported to possess hepatoprotective effect against paracetamol induced hepatotoxicity in albino rats (Nayak et al., 2011). Hence this study was undertaken to explore the utility of Alloe health drink, a commercial preparation available for human use, in poultry for its hepatoprotective effect against aflatoxicosis, which is a perennial problem in tropical countries.

Materials and Method
Aflatoxin was produced on sterile rice by standard procedure and the content was estimated by thin layer chromatography (AOAC, 1990) and mixed in the starter and finisher diet. Alloe health drink®, supplied by a Pvt. firm was supplemented through drinking water.

Two hundred and ten commercial, day-old Vencobb broiler chicks were reared under standard management conditions and randomly allotted to seven treatment groups with three replicates of ten chicks each, after two weeks. T-I served as the control, T-II and T-III were fed with 0.25 and 0.5ppm aflatoxin, respectively. T-IV and T-V were fed with 0.25ppm aflatoxin and supplemented with 1 and 2 per cent alloe health drink, respectively. T-VI and T-VII were fed with 0.5ppm aflatoxin and supplemented with 1 and 2 per cent alloe health drink, respectively.

At the end of the experiment (day 42) six birds from each replicate were randomly selected and blood was collected for antioxidant enzyme assay. Liver was collected in 10% neutral buffered formalin for detailed histopathology.

The data were analyzed by completely randomized design using the SPSS software (V.15) and the means were compared using Duncan's Multiple Range test at the level of P<0.05.

Results and Discussion
Serum antioxidants such as reduced glutathioni-
Table I. Effect of Aloe drink on serum antioxidants (Mean ± SE) in aflatoxin fed broilers (n=18)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>GSH nmol/mL</th>
<th>GPx Units/mL</th>
<th>SOD Units/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>6.26±0.30</td>
<td>12.41±2.62</td>
<td>0.171±0.12</td>
</tr>
<tr>
<td>T2</td>
<td>5.12±0.12</td>
<td>9.23±0.21</td>
<td>0.108±0.02</td>
</tr>
<tr>
<td>T3</td>
<td>4.26±0.87</td>
<td>8.56±0.10</td>
<td>0.065±0.03</td>
</tr>
<tr>
<td>T4</td>
<td>4.73±0.58</td>
<td>8.70±0.18</td>
<td>0.134±0.02</td>
</tr>
<tr>
<td>T5</td>
<td>5.72±1.54</td>
<td>11.32±1.33</td>
<td>0.157±0.01</td>
</tr>
<tr>
<td>T6</td>
<td>4.31±1.20</td>
<td>8.94±0.15</td>
<td>0.125±0.01</td>
</tr>
<tr>
<td>T7</td>
<td>4.64±3.63</td>
<td>10.31±0.36</td>
<td>0.134±0.01</td>
</tr>
</tbody>
</table>

Overall means bearing different superscripts within column differ significantly (P<0.05)

one, glutathione peroxidase and superoxide dismutase were evaluated and presented in table I.

A significant decrease in glutathione peroxidase and superoxide dismutase was observed in groups treated with 0.25 and 0.5ppm aflatoxin. The level was restored to normal in group fed with 0.25ppm aflatoxin and treated with 2 per cent aloe drink. Reduced glutathione was significantly decreased at 0.5ppm aflatoxin. A moderate increase in antioxidants was observed in other groups. Aflatoxin is metabolised to AFB1, epoxide which in turn will conjugate with reduced glutathione in the presence of glutathione-s-transferase and get detoxified. Glutathione peroxidase and superoxide dismutase are the main antioxidant enzymes that scavenge free radicals such as hydrogen peroxide and superoxide radicals. Decreased activity of these antioxidants can lead to accumulation of free radicals and result in damage to corresponding tissues.

*Al*, *vera* is rich in antioxidants such as β-carotene, α-tocopherol etc. which enhance the antioxidant defense of the system against xenobiotics (Chandan et al., 2007). Aloe extracts have been demonstrated to have antioxidant activity in humans and animals (Rajasekaran, 2005; Loots et al., 2007). Aflatoxin administration resulted in centrilobular necrosis, microvesicular changes, proliferation of bile duct and mononuclear infiltration in hepatic parenchyma (Fig. 1 and 2). These changes were reversed by supplementation of 2 per cent aloe drink (Fig. 3). *A. vera* has also been reported to increase bile flow and bile solids thereby stimulating the secretory activity of the liver cells (Hamman, 2008). The hepatoprotective action of the plant...
was attributed to the preservation of liver enzymes through its antioxidant property.

Summary
Supplementation of alloe health drink through drinking water has proved to reverse the hepatotoxicity induced by aflatoxin in a dose dependent manner as evidenced by improvement in serum antioxidant and pathological parameters. Hence, alloe drink at 1-2 per cent level can be recommended to combat aflatoxicosis in broiler chicken.

References

Restricted Selection Indices for Genetic Improvement of Egg Type Chicken*

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Abstract
The present study was undertaken on 2416 pullets, progenies of 252 sires of White Leghorn over five generations (2008-09 to 2012-13), maintained at poultry breeding farm of department of Animal Genetics and Breeding, LUVAS, Hisar. The index Iᵢ, constructed using BWᵢ, AFE, EWᵢ, ENᵢ, BWᵢ and EMᵢ, was found to be most superior index in terms of ΔH (33.44) and Riᵢ (0.656) values. The index IR, constructed with complete restriction on EWᵢ was observed in terms of ΔH (27.14) and Riᵢ (0.533) with expected response in each trait as 16.40g, -0.41days, 0.00g, 2.26 eggs, -3.46g and 74.70g in BWᵢ, AFE, EWᵢ, ENᵢ, BWᵢ and EMᵢ respectively. Restricted indices were inferior to standard selection index (Iᵢ), however, IR, is recommended as the best index for genetic improvement in egg type chicken because there was increase in egg number as well as egg mass, while no change in egg weight.

Key Words: Genetic improvement, Restricted, Selection index, White Leghorn

A breeder may not desire to effect a change in those traits, which have already attained their optimity. To achieve this objective, restricted selection indices are used in such a way that maximum possible increase in the aggregate genetic value is obtained ensuring no change in some of the traits. Keeping this in view, the present study was carried out to construct restricted selection indices imposing complete and partial restriction on egg weight at 40 weeks of age.

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