EFFECT OF DIETARY SUPPLEMENTATION OF TULASI (Ocimum sanctum) AND SELENIUM ON ALANINE TRANSAMINASE (ALT) AND ASPARTATE TRANSAMINASE (AST) LEVELS IN BROILERS

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ABSTRACT

The research was carried out to study the effects of dietary supplementation of Tulasi (Ocimum sanctum) and selenium on ALT and AST enzyme levels in broiler chicken. A total of forty-two broiler chicks of day-old divided into six groups of seven each were used for this study. Ocimum sanctum leaf powder (0.25% and 0.5%), organic selenium (0.3 ppm) and their combinations were added to the basal diet. Body weight and feed consumption were recorded at weekly intervals. Blood samples were taken at the end of 6th week for enzymological assay from each treatment. The enzymes assayed were alanine transaminase (ALT) and aspartate transaminase (AST). Dietary supplementation of Ocimum sanctum leaf powder at 0.25%, 0.5% levels and its combination (0.5% level) with selenium (0.3 ppm) reduced the levels of ALT and AST significantly (P<0.05). It was concluded that Tulasi (Ocimum sanctum) has hepato-protective properties.

Key Words : ALT, AST, Ocimum sanctum, selenium, broiler chicken.

INTRODUCTION

The poultry industry is one of the most dynamic Indian agribusiness trade. In modern poultry production, the rapid growth rate in broilers imposes severe stress on birds, which leads to poor performance and high mortality among chicken. Oxidative stress is the major cause of reduction in growth rate in broilers and increases incidence of infectious and metabolic diseases in poultry. Several types of reactive species are generated in the body as a result of metabolic reactions in the form of free radicals or non-radicals. These species may be either oxygen derived or nitrogen derived and called as pro-oxidants. They attack macromolecules including protein, DNA and lipid etc., causing cellular / tissue damage (Kurien and Scofield, 2006). Oxidative stress causes hepatic cell damage which results in increased circulatory levels of ALT and AST. Recently, there is an increase demand for using natural feed
additives like herbs and edible plants to overcome the adverse effect of oxidative stress on broiler performance. The ubiquitous herb, Tulasi (Ocimum sanctum) is a fairly economic therapeutic plant for several pathological conditions as well as an anti-stress agent (Bhargava and Singh, 1981). Ocimum sanctum is a well known antioxidant which can effectively reduce oxidative stress caused by rapid growth rate in broilers (Varaprasad Reddy et al., 2009). To lessen the adverse effects of the synthetic feed additives on bird as well as on consumer’s health; many of the herbal growth stimulators now a days are being used as an alternative feed additives in the poultry ration (Srivastava et al., 2012). Organic selenium is a natural seleno-aminoacid (selenomethionine) which possesses antioxidant properties and improves resistance against oxidative stress (Mahmoud and Edens, 2003). Dietary supplementation of Ocimum sanctum and its combination with selenium plays a major role in the protection of cell and tissue structure against super oxide radicals and other reactive oxygen species damage (Varaprasad Reddy et al. 2007).

The present experiment was designed to assess the effects of various levels of Tulasi (Ocimum Sanctum), selenium and their different combinations as supplement to broilers diet on alanine transaminase (ALT) also called serum glutamic pyruvic transaminase (SGPT) and aspartate transaminase (AST) also called serum glutamic oxaloacetic transaminase (SGOT) levels in broilers.

MATERIALS AND METHODS

A total of 42 day-old Cobb broiler chicks were randomly divided into six groups comprising of seven birds in each group with the following dietary regimens.

Group I (control) supplemented with standard diet

Group II supplemented with standard diet + Ocimum sanctum @ 0.25%

Group III supplemented with standard diet + Ocimum sanctum @ 0.5%

Group IV supplemented with standard diet + Organic selenium @ 0.3 ppm

Group V supplemented with standard diet + Ocimum sanctum@ 0.25% and 0.3 ppm organic selenium

Group VI supplemented with standard diet + Ocimum sanctum@ 0.5% and 0.3 ppm organic selenium

The chicks were wing banded and weighed individually. The birds were reared in cages under standard managemental practices from day-old to six weeks of age. Freshly collected, shade dried Ocimum sanctum leaf powder and organic selenium were supplemented as above to the standard broiler diet. The broiler starter and finisher diets were fed ad libitum to the birds.

Blood samples were collected at the end of 6th week for estimation of alanine transaminase (ALT) and aspartate transaminase (AST). The levels of ALT and AST were measured by IFCC (International Federation of Clinical Chemistry) method as described in (Burits and Ashwood, 1996). Statistical analysis analysis of the data was analyzed by one way ANOVA as per Snedecor and Cochran (1989).
RESULTS AND DISCUSSION

The mean serum ALT and AST values of broilers at 6th week of age as influenced by dietary supplementation of *Ocimum sanctum* and selenium is presented in Table 1. In the present study, dietary supplementation of *Ocimum sanctum* at 0.25% level (Group II) and at 0.5% level (Group III) and *Ocimum sanctum* at 0.5% level and its combination with selenium at 0.3ppm (Group VI) significantly (P<0.05) decreased serum ALT levels. *Ocimum sanctum* at 0.25% level (Group II), at 0.5% level (Group III) and *Ocimum sanctum* at 0.5% level with a combination of selenium at 0.3ppm (Group VI) significantly decreased serum AST levels. *Ocimum sanctum* alone at 0.25% level (Group II) and at 0.5% level (Group III) found to be more effective in reducing ALT and AST levels when compared to selenium alone at 0.3ppm (Group IV). However, *Ocimum sanctum* at 0.5% level and selenium at 0.3ppm combination (Group VI) were found to possess a superior effect on ALT levels. *Ocimum sanctum* at 0.5% level (Group III) was found to possess a superior effect on serum AST levels.

The results of our study are in accordance with the earlier reports of Patankar et al. (2011), who observed that AST values were significantly (P<0.05) lower with dietary supplementation of *Ocimum sanctum* leaf powder at 0.5% levels in broilers. Atul Prakash et al., (2009) observed a significant decrease in the levels of liver enzymes (ALT & ALP) in broilers with dietary supplementation of *Ocimum sanctum* leaf powder. Sapcota and Upadhyaya (2009) also reported that supplementation of *Ocimum sanctum* leaf powder in feed containing aflatoxins had significantly reduced ALT and AST enzyme activities in broilers. Similarly, Gupta and Charan (2007) also reported a lower AST (SGOT) levels in serum of broilers fed with *Ocimum sanctum* supplementation. On contrary, Tirupathi Reddy et al., (2012) observed no significant difference in levels of ALT & AST in broilers by dietary supplementation of Tulasi (*Ocimum sanctum*) at 0.25%, 0.5% and its combination with Amla and Turmeric.

In the present study, serum ALT levels decreased significantly (P<0.05) in broilers supplemented with selenium at 0.3ppm (Group IV) and in combination with *Ocimum sanctum* at 0.25% level (Group V), at 0.5% level (Group VI) when compared with control (Group I). Similar findings were observed by Ismail Seven et al., (2009) who observed significant (P<0.05) decrease in ALT levels with dietary supplementation of selenium at 0.2ppm, when compared with control group of broilers.

The results obtained in the present study revealed that the dietary supplementation of Tulasi (*Ocimum sanctum*) alone at 0.25% and 0.5% levels were found to be more effective in reducing ALT and AST levels when compared to selenium alone at 0.3ppm. The values showing normal satisfactory liver function from dietary supplementation of Tulasi (*Ocimum sanctum*) as well as organic selenium as compared to control group. These results, clearly indicated that Tulasi (*Ocimum sanctum*) has hepato-protective properties.
Effect of dietary supplementation of tulasi and selenium on alanine transaminase

Table 1
Effects of Ocimum sanctum, selenium and their combinations on ALT and AST values in broilers

<table>
<thead>
<tr>
<th>Groups</th>
<th>ALT (IU/L)</th>
<th>AST (IU/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>8.00f</td>
<td>134.53f</td>
</tr>
<tr>
<td>II</td>
<td>5.50c</td>
<td>115.56b</td>
</tr>
<tr>
<td>III</td>
<td>5.17b</td>
<td>106.10a</td>
</tr>
<tr>
<td>IV</td>
<td>7.50c</td>
<td>125.72c</td>
</tr>
<tr>
<td>V</td>
<td>6.00d</td>
<td>122.12a</td>
</tr>
<tr>
<td>VI</td>
<td>5.00a</td>
<td>118.06c</td>
</tr>
</tbody>
</table>

Means bearing different superscripts in a column differ significantly (P<0.05).

REFERENCES


Ismail Seven, Pinar Tatli Seven and Sevalyilmaz (2009). Response of broilers under cold conditioning (15°C) to dietary triiodothyronine and iodine combined to antioxidants (Selenium and Vit C). Kafkas Univ Vet Fak Derg, 15(4): 499 – 504.


