Effect of Supplementation of Turmeric and Ginger on Haematobiochemical Profile in SVVU T17 Grower Pigs

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ABSTRACT

A study was conducted on eighteen SVVU T-17 grower pigs of 3 months age with similar body weights, and were divided into three groups with 6 pigs in each group for a period of 60 days to study the effect of inclusion of turmeric and ginger supplementation @ 1% in the basal diet on the haematobiochemical profile. The study revealed that among the haematological parameters Hb and PCV exhibited significantly higher values within the physiological range in turmeric group compared to other groups. Among several biochemical parameters observed under the study, ALT and AST were exhibited significant decrease in turmeric and ginger groups. Total protein, albumin, globulin levels were in similar range with control group. Cholesterol exhibited significant decrease in turmeric and ginger groups compared to the control group. Turmeric and ginger had hepato-protective nature and a positive effect on overall health performance. Especially, turmeric had direct positive effect on haematobiochemical profile when compared to the other groups.

Key words: SVVU T17 Grower pigs, Turmeric, Ginger, Haematobiochemical profile

Grower pigs have a rapid growth rate, which causes a great deal of stress and leads to poor performance and a high mortality rate. In order to increase animal productivity and profitability, antibiotics have been widely employed as growth promoters in livestock. Contrarily, frequent use of antibiotics encourages antibiotic resistance, which may be harmful to both human and animal health. As a result, the use of antibiotics in animal feed has been outlawed or restricted in a number of nations. Consequently, it is essential to use prebiotics, probiotics, essential oils, dietary enzymes, natural herbs, and medicinal plants or phytobiotics to modify the gut microbiota to have positive effects on the host. To enhance meat quality, nutrient digestibility, immunological function, and growth performance, herbs and their extracts are used in swine diets. Hence the present study was conducted to assess the effect of supplementation of turmeric and ginger on haematobiochemical profile in SVVU T-17 grower pigs.

MATERIALS AND METHODS

The experiment was conducted in eighteen SVVU T17 grower pigs of around 3 months age and were assigned into three homogeneous treatment groups randomly Control (C), Turmeric (T) and Ginger (G) with six pigs in each group. The trial was conducted for a period of 60 days in order to investigate the effects of supplementation of turmeric and ginger on haematobiochemical parameters. The research was conducted at ICAR-AICRP on Pigs Tirupati. Blood samples were collected from pigs on 0th and 60th day of experimental period from...
RESULTS AND DISCUSSION

The experiment was conducted in eighteen SVVU T17 grower pigs of around 3 months age and were assigned into three homogeneous treatment groups randomly Control (C), Turmeric (T) and Ginger (G) with six pigs in each group. The trial was conducted for a period of 60 days in order to investigate the effects of supplementation of turmeric and ginger on haematological parameters. The research was conducted at ICAR-AICRP on Pigs Tirupati. Blood samples were collected from pigs on 0th and 60th day of experimental period from the ear vein of pigs into ethylene diamine tetra acetic acid (EDTA) coated vacutainer tubes and clot activator vials for serum collection. Haematological values were obtained using a Mindray BC-2800 vet fully automatic haematology analyser. The semi-automatic Mispa VIVA biochemistry analyzer (Agappe) calculated the serum biochemical parameters in accordance with industry standards using kits provided by Erba. The results obtained were subjected to analysis through software (version 22.0, SPSS 2013) by applying one-way analysis of variance through generalized linear model and the treatment means were ranked using Duncan's multiple range test with a significance at P<0.05 (Duncan 1955). All the statistical procedures were done as per Snedecor and Cochran (1994).

Among several haematological parameters observed under present study, TEC and TLC didn’t show significant difference in turmeric supplemented group, these are in agreement with the findings of 1,2 in pigs who also observed no significant difference in TEC and TLC in turmeric supplemented groups. The results of our current study were in contrast with the findings of 3,4 in TEC. 

In our current study, Hb concentration was significantly (P<0.05) increased in turmeric supplemented group, which was in agreement with 4,6 who recorded a significant (P<0.05) increase of Hb concentration in turmeric supplemented broilers. Whereas, in contrast with our results 1,2 reported a non-significant effect on the Hb concentration with dietary supplementation of turmeric in pigs.

Significantly (P<0.05) increased PCV in the present study with turmeric supplementation is in agreement with6 who reported a significant increase in PCV with turmeric powder supplementation in broilers. The increase in Hb and PCV in group T with supplementation of turmeric might have been due to enhanced absorption of essential minerals like iron and copper which are essential for heme pigment synthesis, leading in better overall erythrocytic proliferation, haemoglobin synthesis and erythrocytes maturation.

Results in the present study with respect to haematological parameters with supplementation of ginger powder, showed a non-significant difference in all blood parameters which are in agreement with findings of 7,8 and 9 in pigs who reported similar results with ginger supplementation. Whereas, in contrast with our results 10 and 11 in sheep, reported a significant increase in the blood parameters in ginger.
supplemented groups. The haemoglobin levels and PCV were also not affected significantly in the animals supplemented with ginger in our study was in agreement with\(^8,9\).

The biochemical parameters that were designed for the study were estimated from serum separated from blood collected at the 60\(^{th}\) day of the experiment were given in the table 2. Serum collected from 60\(^{th}\) day of experimental period (table 2) represented a significant decrease (P<0.05) in alanine transaminase (ALT) levels in group T, and group G compared to group C. Similarly, AST levels were also decreased significantly (P<0.05) in group T and group G compared to the group C. Total protein, albumin and globulin did not differ significantly (P>0.05) among the different groups. Cholesterol concentration showed a significant (P<0.05) decrease in T and G groups compared to C group.

From the current results, it was observed that biochemical parameters were influenced with turmeric and ginger supplementation, especially ALT, AST and cholesterol levels were decreased significantly (P<0.05) in T group and G group. The ALT and AST activity levels are thought of as diagnostic instruments that can be used to assess the health condition of liver, hepatotoxicity etc.,\(^{12}\). The detoxification, metabolism, and removal of endogenous and

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control (C)</th>
<th>Turmeric (T)</th>
<th>Ginger (G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT (IU/L)</td>
<td>41.58±0.79(^b)</td>
<td>33.23±1.52(^a)</td>
<td>32.74±1.03(^a)</td>
</tr>
<tr>
<td>AST (IU/L)</td>
<td>48.94±0.61(^b)</td>
<td>38.03±1.06(^a)</td>
<td>37.42±1.18(^a)</td>
</tr>
<tr>
<td>Total Protein (g/dl)</td>
<td>6.88±0.19(^ab)</td>
<td>6.95±0.14(^a)</td>
<td>6.34±0.19(^a)</td>
</tr>
<tr>
<td>Albumin (g/dl)</td>
<td>4.21±0.26(^a)</td>
<td>4.36±0.22(^a)</td>
<td>3.73±0.15(^a)</td>
</tr>
<tr>
<td>Globulin (g/dl)</td>
<td>2.66±0.17(^a)</td>
<td>2.59±0.12(^a)</td>
<td>2.60±0.13(^a)</td>
</tr>
<tr>
<td>Cholesterol (mg/dl)</td>
<td>101.91±2.75(^b)</td>
<td>83.11±2.22(^a)</td>
<td>86.89±2.00(^a)</td>
</tr>
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<td>ALT (IU/L)</td>
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</tr>
</tbody>
</table>

Note: Means with different superscript(s) in each row differ significantly (P<0.05)
exogenous chemicals are all crucial functions of the liver. Better liver functionality is indicated by the drop in liver enzymes (ALT and AST) across all treatment groups while they were still within physiological range. In our present study decreased ALT and AST levels in the turmeric and ginger supplemented group when compared with control group clearly indicated the hepatoprotective nature of turmeric and ginger powder.

The decreased levels of AST with supplementation of turmeric in current study are in agreement with the findings of\textsuperscript{13} in rabbits, who reported a significant decrease in AST levels with dietary turmeric supplementation. Whereas, in contrast with findings of \textsuperscript{14} who reported an increased AST levels in turmeric powder supplemented group in broilers. There was significant decrease in ALT levels in turmeric supplemented animals in our study is in agreement with\textsuperscript{13} in rabbits, \textsuperscript{14} in broilers and is in contrast with the findings of, \textsuperscript{15} in broilers who reported a non-significant difference in ALT levels with turmeric supplementation. However, group G which was supplemented with ginger also showed significant decrease in AST and ALT levels are in agreement with\textsuperscript{8} in pigs who reported that ALT and AST levels were decreased with ginger supplementation. Whereas, in contrast with the findings of\textsuperscript{16}, \textsuperscript{17} in broilers, who observed a non-significant change with inclusion of ginger.

Total protein didn’t show significant difference with turmeric supplementation in our current study is in agreement with\textsuperscript{2} in pigs. Whereas, in contrast with findings of \textsuperscript{6} in broilers, \textsuperscript{13} in rabbits supplemented with turmeric in the basal diet. Total protein didn’t show significant difference in the present study with ginger supplementation was in agreement with the findings of \textsuperscript{9} in pigs, and was in contrast with the results of \textsuperscript{18} in pigs who reported an increase in total protein with ginger supplementation. In the present study, there was no significant difference in albumin in turmeric supplemented group is in agreement with \textsuperscript{2} in pigs, and was in contrast with findings of\textsuperscript{13} in rabbits. Similarly, Globulin also didn’t show significant difference with turmeric supplementation, these findings were in contrast with the findings of \textsuperscript{6} in broilers, \textsuperscript{13} in rabbits.

Cholesterol levels were significantly (P<0.05) reduced in the turmeric supplemented groups in the present study is in agreement with the findings of \textsuperscript{13} in rabbits, \textsuperscript{15} in broilers. The concentration of plasma cholesterol in the body can be regulated via biosynthesis of cholesterol, removal of cholesterol from the circulation, absorption of dietary cholesterol or excretion of cholesterol via bile and faeces. The reduction of total cholesterol may be due to curcumin that enhances bile production and hence lipid digestion. Inclusion of \textit{Curcuma longa} in the diet led to an increase in the 3-hydroxy-3-methylglutaryl coenzyme reductase inhibitor activity, thereby, the reduction of 3-hydroxy-3-methylglutaryl coenzyme reductase resulted in a decrease in total cholesterol biosynthesis. Whereas, cholesterol was significantly (P<0.05) decreased in the ginger supplemented animals and these results are in agreement with the findings of \textsuperscript{19}, \textsuperscript{8} in pigs but, in contrast with findings of \textsuperscript{18} in pigs, who observed a non-significant difference in cholesterol levels with ginger supplementation. The hypolipidemic effect of ginger may be attributed to stimulation of the conversion of cholesterol to bile acids, an important pathway of elimination of cholesterol from the body by ginger.

**CONCLUSION**

Among several haemato-biochemical parameters set for the study, Hb, PCV exhibited significant increase (P<0.05) in turmeric supplemented group. ALT and AST exhibited significant decrease in turmeric and ginger groups. Whereas, cholesterol levels were significantly decreased in turmeric and ginger group when compared to the control group.
REFERENCES


