Evaluation of turmeric powder in diets based soybean oil on performance, energy and protein efficiency ratio and immune system of broiler chicks

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Abstracts:

Objectives: The aim of this study was to determine the effects of turmeric powder in diets based on soybean oil, on performance, energy and protein efficiency ratio and immune system of broiler chicks.

Methodology: Two hundred sixty-four one-day old broilers were randomly assigned to 3 dietary treatments containing 0, 0.4 and 0.8% turmeric powder (TP). Each dietary treatment was replicated 4 times with 22 broilers each. Feed and fresh water were supplied ad libitum. Body weight and feed consumption were measured weekly. At 28 days age of broilers, one bird from each replicate slaughtered and the relative weight of each organ were computed. Data were subjected to the analysis of variance using the General Linear Model of SAS.

Results: As a result, dietary treatments did not affect (P >0.05) body weight gain, feed intake, and feed: gain ratio of broilers. The European production index increased in broilers fed diets contained 8 g TP /kg. Energy and protein efficiency ratio, were not statistically different among dietary treatments but broilers fed highest level of TP has numerically higher value. TP did not affect relative weight of organs except the relative weight of heart increased. The turmeric powder was not influenced on antibody response against SRBC, IgG and IgM.

Conclusion: Supplementation of turmeric powder to diets based soybean oil could improve production index in broiler fed diets contained 8 g/kg.

Key words: Turmeric powder, soybean oil, energy and protein efficiency ratio, broiler

Introduction:

Turmeric is a medicinal herb native to the Asian that has a considerable content of curcumin (diferuloylmethane). The main antioxidant component in turmeric is curcumin that is a phenolic antioxidant. Curcumin prevents the lipids from oxidation (Sreejayan et al., 1997). Turmeric powder is used as a food additive, preservative and coloring agent in Asian countries, including China and South East Asia. It has many effects including antiinflammatory, antioxidant, anticarcinogenic, antimutagenic, anticoagulant, antifertility, antidiabetic, antibacterial, antifungal, antiprotozoal, antiviral, antifibrotic, antivenom, hypotensive and hypocholesteremic activities (Chattopadhyay et al., 2004). There are some researches that reported an improvement in performance parameters of broilers fed TP (Suvanated et al., 2003; Zeinali et al.2009). Other researchers also reported a reduction in feed intake and an improvement in FCR of broilers fed turmeric powder (Wuthi-Udomler et al., 2000; Samarasinghe et al., 2002; Durrani et al., 2006).

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Emadi and Kermanshahi (2007b) reported an improvement in antibody response against SRBC, IgG and IgM. However no alterations in immune response to Newcastle vaccination of birds fed TP were observed (Mehala and Moorthy 2008). The hemoglobin values of broilers fed 0.8 g/kg reduced but the erythrocytes and hematocrit were not affected by the concentration of TP in dietary treatment (Sugiharto et al. 2011). However an increasing in the value of hemoglobin and a reduction in red blood cell count of broilers fed TP revealed (Emadi et al., 2007).

Materials and Methods:
Two hundred sixty-four one-day old broilers were randomly allocated to 3 dietary treatments containing 0, 0.4 and 0.8% turmeric powder (TP). Each dietary treatment was replicated 4 times with 22 broilers each. Feed and fresh water were accessed *ad libitum*. Body weight and feed consumption were measured weekly. Feed conversion ratio, European production index, Energy and protein efficiency ratio were calculated. At 28 day age of broilers, one bird from each replicate slaughtered and the relative weight of each organ were computed. Data were subjected to the analysis of variance using the General Linear Model of SAS.

Results and Discussions:
Dietary treatments did not affect (P >0.05) body weight gain, feed intake, and feed: gain ratio of broilers. The European production index increased in broilers fed diets contained 8 g TP /kg. A reduction in feed intake and an improvement in FCR of broilers fed turmeric powder were reported (Wuthi-Udomler et al., 2000; Samarasinghe et al., 2002; Durrani et al., 2006). Energy and protein efficiency ratio were not statistically different among dietary treatments but broilers fed highest level of TP has numerically higher value. TP did not affect relative weight of organs (thigh and breast meat, liver, pancreas, bursa of fabricuse, spleen, and bile) except the relative weight of heart increased and abdominal fat decreased. The turmeric powder was not influenced on antibody response against SRBC, Newcastle, IgG and IgM. The same results in immune response to Newcastle vaccination of birds fed TP were reported (Mehala and Moorthy 2008).

Table1: Performance parameters of broilers fed turmeric powder in diets based soybean oil at 28 days of age

<table>
<thead>
<tr>
<th>Dietary treatment</th>
<th>FI</th>
<th>BW</th>
<th>FCR</th>
<th>EPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>1602.26</td>
<td>1110.44</td>
<td>1.445</td>
<td>2.753&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>0.4% turmeric powder</td>
<td>1600.87</td>
<td>1119.54</td>
<td>1.428</td>
<td>2.718&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>0.8% turmeric powder</td>
<td>1614.21</td>
<td>1152.25</td>
<td>1.400</td>
<td>2.938&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>MSE</td>
<td>176.22</td>
<td>151.28</td>
<td>0.011</td>
<td>0.0569</td>
</tr>
<tr>
<td>Pr&gt;f</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>0.0413</td>
</tr>
</tbody>
</table>

<sup>a,b,c, Column with no common superscript differ significantly (P<0.05)</sup>
Table 2: Energy and protein efficiency ratio of broilers fed turmeric powder in diets based soybean oil at 28 days of age

<table>
<thead>
<tr>
<th>Dietary treatment</th>
<th>Energy efficiency ratio</th>
<th>Protein efficiency ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>18.075</td>
<td>2.695</td>
</tr>
<tr>
<td>0.4% turmeric powder</td>
<td>18.380</td>
<td>2.743</td>
</tr>
<tr>
<td>0.8% turmeric powder</td>
<td>19.003</td>
<td>2.843</td>
</tr>
<tr>
<td>MSE</td>
<td>2.21</td>
<td>0.0476</td>
</tr>
<tr>
<td>Pr&gt;f</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

a,b,c, Column with no common superscript differ significantly (P<0.05).

Conclusion: Supplementation of turmeric powder to diets based soybean oil could improve production index in broiler fed diets contained 8 g/kg without affect immune system.

References: