Effects of Canola Oil Peroxide at Different Replicate of Heating on Blood Parameters in Japanese Quail

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ABSTRACT: This experiment was conducted to evaluate the effects of different levels (0, 2 and 4%) of canola oil and 2 levels of heat (1 and 2 time heated) on blood biochemical parameters of Japanese quails. This study carried out in factorial (3×2) experiment based on completely randomized design with 360 of Japanese quails in 6 treatments and 3 replicate for 35 of day. In this study, blood biochemical parameters are evaluated. Experimental diets based on corn and soybean meal. Different levels of canola oil and heat have no significant effect on serum glucose, cholesterol, HDL and LDL levels in Japanese quail. Serum triglyceride concentrations in quails fed with 4% oil (heated twice) was significantly higher than the other treatments (P<0.05). Using of canola oil can decrease quails blood HDL and LDL.

Keywords: Canola oil, heating, blood parameters, Japanese quail

INTRODUCTION

Broiler production plays a major role in food security for the rapidly increasing Cambodian human population. Their short production cycle, high feed efficiency and high biomass per unit of agricultural land are particularly attractive for the Cambodian production system. However, compared to other domestic animals, broiler chickens are more susceptible to changing environmental conditions (Nolan et al., 1999).

The most practical method for increasing the energy density of diets in poultry feeding is through the addition of fats and oils (Peebles et al., 2000). It was reported that fat metabolism and deposition in poultry could be affected by different dietary fats and fatty acids (Snaz et al., 2000; Pesti et al., 2002). Also they assist vitamin A and Ca absorption (Sklan, 1980; Corino et al., 1980; Leeson and Atteh, 1995). Some concerns that should be noted with fat utilization include: use of higher levels of fat may negate the effects of pelleting, measurement of metabolizable energy (ME) content can be difficult, there is the potential for rancidity, equipment needs relative to fat sources in broiler chick's nutrition is canola oil. Canola oil has been recognized as adequate mixture of essential fatty acids, unsaturated fatty acids such a linolenic acid (C18:3) that can improve broiler performance, also linolenic acids can be converted to longer chain omega-3 fatty acids (Sim et al., 1990; Yang et al., 2000) that is an important factor in animal feeding and is for promote of health (Bezard et al., 1994). Adding 3% of canola oil and poultry fat resulted in significant improvement in body weight and better feed conversion ratio in fed groups 3 % canola oil and poultry fat than other groups observed, no significant different were found in liver, breast, thigh weights in between groups fed lipid in comparison with the control group. Addition of 6% poultry fat caused significant increasing on abdominal fat, gizzard weight was significantly higher in control group in comparison with other groups observed, no significant different were found in liver, breast, thigh weights in between groups fed lipid in comparison with the control group.

INCLUSION

Inclusion at 4% level, increased the thigh, breast, liver and small intestine weights (P<0.05). One of the oil sources in broiler chick's nutrition is canola oil. Canola oil has been recognized as adequate mixture of essential fatty acids, unsaturated fatty acids such a linolenic acid (C18:3) that can improve broiler performance, also linolenic acids can be converted to longer chain omega-3 fatty acids (Sim et al., 1990; Yang et al., 2000) that is an important factor in animal feeding and is for promote of health (Bezard et al., 1994). Adding 3% of canola oil and poultry fat resulted in significant improvement in body weight and better feed conversion ratio in fed groups 3 % canola oil and poultry fat than other groups observed, no significant different were found in liver, breast, thigh weights in between groups fed lipid in comparison with the control group. Addition of 6% poultry fat caused significant increasing on abdominal fat, gizzard weight was significantly higher in control group in comparison with other groups observed, no significant different were found in liver, breast, thigh weights in between groups fed lipid in comparison with the control group.
In the present experiment the effects of three levels of canola oil (0, 2 and 4 percents) and 2 levels of heat (1 and 2 times of heating) were investigate on blood biochemical of Japanese Quails.

MATERIALS and METHODS

This study was conducted as 3×2 factorial experiment with 3 levels of canola oil (0, 2 and 4) and 2 levels of heat (1 and 2 times heated). In this experiment 360 Japanese quail were allocated randomly to 6 experimental diets. The diets and water was provided ad libitum. To study the effects of different dietary treatments on blood parameters, blood samples were collected from birds in each treatment.

The data were subjected to analysis of variance procedures appropriate for a completely randomized design using the General Linear Model procedures of SAS Institute (2005). Means were compared using the Duncan multiple range test. Differences were considered significant at P<0.05.

RESULTS and DISCUSSION

The effects of different levels of canola oil and heat and interactions of them on blood biochemical parameters in Japanese quail are summarized in Table 1. There were no significant differences between treatments with added dietary canola oil. Treating of diets with 1 and 2 times heat showed no significant on blood parameters. The interaction of canola oil × heating times had significant effect on HDL of Japanese quail (P<0.05). The highest and lowest HDL (130 mg/dl) and (79.67 mg/dl) resulted in groups with 4% of canola oil and one and 2 times heating respectively. The reasons those mentioned about canola oil, could also cause significant difference in interactions between canola oil levels and treating with heat. Compared with the levels of canola oil, interaction canola oil × heat time could not significantly affect the amount of glucose, cholesterol HDL and LDL. However using canola oil and heat time had adverse effects on amount of triglyceride.

Pal et al., (2002) reported that the type of fat added to the diet did not affect the glucose levels and omega-3 fatty acids changed the effects of insulin and glucagon on the plasma glucose. Atakisi et al., (2009) reported that omega-3 fatty acids reduced egg and plasma cholesterol as well as plasma glucose level and no change was observed in triglyceride levels with the supplementation in quails. Zanini et al., (2008) reported that supplementing broiler diets with canola oil resulted in a decrease in the lipid content of edible portions. Lipid accretion accounts for part of the body mass of animals and birds. It would therefore appear that in quail, canola oil could probably cause a decrease in lipid accretion of tissues which could explain the similarities in the growth performance of the quail. Magubane et al., (2013) observed that female quail on a standard diet supplemented with canola oil (10% w/w) had significantly higher (P<0.05) plasma triglycerides compared to their counterparts on the control diet.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Canola oil</th>
<th>glucose</th>
<th>cholesterol</th>
<th>triglyceride</th>
<th>HDL</th>
<th>LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>303.67</td>
<td>199.67</td>
<td>93.33</td>
<td>112.50</td>
<td>122.60</td>
<td></td>
</tr>
<tr>
<td>2%</td>
<td>298.00</td>
<td>234.83</td>
<td>118.67</td>
<td>101.70</td>
<td>109.40</td>
<td></td>
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<tr>
<td>4%</td>
<td>313.83</td>
<td>215.17</td>
<td>104.83</td>
<td>98.10</td>
<td>92.77</td>
<td></td>
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<tr>
<td>P-Value</td>
<td>0.1459</td>
<td>0.0869</td>
<td>0.3404</td>
<td>0.6671</td>
<td>0.1005</td>
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</tr>
<tr>
<td>SEM</td>
<td>6.95</td>
<td>7.12</td>
<td>9.65</td>
<td>5.70</td>
<td>6.33</td>
<td></td>
</tr>
<tr>
<td>Heat times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>303.67</td>
<td>199.67</td>
<td>93.33</td>
<td>112.50</td>
<td>122.60</td>
<td></td>
</tr>
<tr>
<td>one time</td>
<td>300.00</td>
<td>226.67</td>
<td>110.17</td>
<td>103.50</td>
<td>101.13</td>
<td></td>
</tr>
<tr>
<td>2 times</td>
<td>311.83</td>
<td>223.33</td>
<td>113.33</td>
<td>96.30</td>
<td>101.03</td>
<td></td>
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<tr>
<td>P-Value</td>
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<td>0.7494</td>
<td>0.8223</td>
<td>39.79</td>
<td>0.9914</td>
<td></td>
</tr>
<tr>
<td>SEM</td>
<td>6.95</td>
<td>7.12</td>
<td>9.65</td>
<td>5.70</td>
<td>6.33</td>
<td></td>
</tr>
<tr>
<td>Interaction of canola oil × heating</td>
<td>303.66</td>
<td>199.67</td>
<td>93.33 b</td>
<td>112.50</td>
<td>122.60</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2% one time</td>
<td>278.67</td>
<td>240.00</td>
<td>104.67 b</td>
<td>105.00</td>
<td>106.87</td>
</tr>
<tr>
<td>2%</td>
<td>311.33</td>
<td>229.67</td>
<td>96.67 b</td>
<td>98.40</td>
<td>111.93</td>
<td></td>
</tr>
<tr>
<td>4%</td>
<td>321.33</td>
<td>213.33</td>
<td>97.67 b</td>
<td>102.00</td>
<td>95.40</td>
<td></td>
</tr>
<tr>
<td>4%</td>
<td>306.33</td>
<td>217.00</td>
<td>130.00 a</td>
<td>94.20</td>
<td>90.13</td>
<td></td>
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<tr>
<td>P-Value</td>
<td>0.1258</td>
<td>0.5071</td>
<td>0.0086</td>
<td>0.9425</td>
<td>0.5800</td>
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<tr>
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<td>10.08</td>
<td>11.64</td>
<td>8.06</td>
<td>8.95</td>
<td></td>
</tr>
</tbody>
</table>

a,b Means within a column that do not share a common superscript are significantly different (P<0.05).

CONCLUSION

The overall results indicated that in Japanese quails adding canola oil until 4% without any adverse effects on blood biochemical parameters of broilers is possible, but treating 2 times with heat has adverse effects in these respects and is recommended to decrease the triglyceride amount.
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REFERENCES