Effect of sesame seeds on blood physiological and biochemical parameters in broiler breeder hens

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(Received July 1, 2008; Accepted February 19, 2009)

Abstract

The study was carried out to investigate the effect of employing sesame seeds in broiler breeder diet on some physiological parameters. 30 Cobb breeder hens (36 week age) were divided into 3 groups (10 hens each). The 1st group was reared on standard ration (control), the 2nd group was reared on standard ration and given orally Sesame seeds capsules daily (250 mg /kg) and the 3rd group was reared on standard ration and given orally Sesame seeds capsules daily (500 mg/kg). The treatment continues for 4 weeks period. Results showed a significant increase in the RBCs, Hb and PCV in the 2nd group as compared with control (61.48, 6.86 and 18.66 g), respectively. It is concluded that, sesame seeds treatment continues for 4 weeks also caused a significant increase in the WBC count in the 2nd and 3rd group as compared with control (500 mg/kg) causes a significant increase in plasma levels of FSH (0.88 miu / ml) compared with control (3.93 miu / ml), but the sesame seeds treatment (500 mg/kg) causes a significant increase in plasma levels of FSH (0.88 miu / ml) compared with control (0.64 miu / ml). Sesame seeds treatment, also, increased the egg weight, shell weight and yolk weight and it reached the levels of significantly in the 3rd group compared with other groups after 2 and 4 weeks of treatment was noticed. Sesame seeds treatments were accompanied by a significant decrease in MCV and MCH. Significant increase in the MCHC in the 3rd group compared with with other groups after 2 and 4 weeks of treatment was noticed. Hormonal Assay revealed that sesame seeds treatment in broiler breeder hens increased plasma levels of LH hormone (4.94 and 4.48 miu/ml) compared with control (3.93 miu / ml), but the sesame seeds treatment (500 mg/kg) causes a significant increase in plasma levels of FSH (0.88 miu / ml) compared with control (0.64 miu / ml). sesame seeds treatment, also, increased the egg weight, shell weight and yolk weight and it reached the levels of significantly in the 3rd group (66.15, 7.33 and 20.65 g) respectively as compared with control (61.48, 6.86 and 18.66 g), respectively. It is concluded that, sesame seeds treatment enhanced erythropoiesis, FSH activity and some productive parameters.

Keywords: Sesame seed; Erythropoiesis; Breeder hens.

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Tأثير بذور السمسم في بعض الصفات الدموية والكيميائية في أميّات فروج اللحم

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الخلاصة

أجريت هذه الدراسة لبحث تأثير استخدام بذور السمسم في علاج أميّات فروج اللحم على بعض الصفات الفيسيولوجية والكيميائية. جرى تقسيم 30 دجاجة بيدا نوع Cobb عمرها 31 أسبوعًا إلى 3 مجموعات (10 دجاجات / مجموعة). المجموعة الأولى : بذور السمسم يومياً بالجرعة ٢٥٠ ملغ / كجم وزن الجسم، والمجموعة الثالثة : بذور السمسم يومياً بالجرعة ٥٠٠ ملغ / كجم وزن الجسم. واستمرت المعاملة لمدة ٤ أسابيع. بينت النتائج وجود ارتفاع معنوي في العديد من الكليات في الدم الحمر والتركيز الورمي في الدم المرصوص في المجموعة الثانية، والتأنير معنوي في الدم المرصوص في المجموعة الثالثة، وترافق هذا مع ارتفاع معنوي في معدل حجم الكرد ومعنوي اليدويموزين الكرد.
The plant material was consisted of Sesame seeds (Sesamum indicum) which belongs to the Family Pedaliaceae.

The study was carried on 30 Cobb layer hens (36 weeks age) and were divided into 3 groups (10 hens each). The treatment continued daily for 4 weeks period. The 1st group was reared on standard ration and given empty capsules (placebo). The 2nd group was reared on standard ration and given orally Sesame seeds capsules daily (250 mg / kg b.wt) for 4 weeks, the 3rd group was reared on standard ration and given orally Sesame seeds capsules daily (500 mg / kg b.wt).

Blood samples were collected on the 14th and 28th days of treatment periods from the wing vein. The blood was divided into 2 parts, on with anticoagulant (EDTA) and used for the examination of blood picture, the other part was used to separate the serum which used for hormonal assay (LH and FSH). Eggs also collected at the end of 4 weeks treatment and subjected to few measurements.

One way analysis of variance, was used for data analysis and specific groups differences were determined using Duncan’s multiple range test (12) at $P \leq 0.05$ significant level.

The Sesame seeds in breeder diet enhances the erythropoiesis as shown by a significant increase in the RBC count, Hb and PCV compared with the control group, and it was reflected in the significant increase in the MCV and MCH, and the significant increase in the MCHC, after 2 weeks of treatment, (Table 1) and after 4 weeks of treatment (Table 2). Sesame seeds treatment for 4 weeks also caused a significant increase in the total leucocytes count as compared with the control group (Table 2).

Sesame seeds treatment (500 mg / kg b.wt) caused a significant increase in egg weight, shell weight and yolk weight as compared with the control group (Fig 1 and Fig.2).

The hormonal study revealed that the LH plasma levels were not affected by Sesame seeds treatment, while the FSH plasma levels were significantly ($P \leq 0.05$) increased compared with the control group (Fig.1 and Fig.2).
Discussion

Sesame seeds effects which enhances the blood picture represented by the increase in RBC, Hb and PCV, may be related to Sesame lignans which have an antioxidant and health promoting activities. (6), also Sesame ingestion significantly increased the time for erythrocyte hemolysis due to the reduction of the thiobarbituric acid – reactive substances (13). In animals studies.(14) showed feeding Sesame lignans to rats resulted in a significant increase of γ- tocopherol levels in blood and liver, and a significant decrease in lipid peroxidation, which prevents the free radical damaging to the cell membrane and prevents its hemolysis further more, (15) showed that the increase in prooxidant elements reduced the activity of Υ Aminolevulinate dehydrates (Υ - AIA-D), which in a sulfhydryl containing enzyme, (16) explain that Υ - AIA – D is an essential enzyme for the biosynthesis of physiologically important protein as hemoglobin and cytochromes. The significant decrease in MCV and MCVH may belongs to the presence of negative correlation with the RBC, Hb and PCV (17), and the significant increase in the MCHC may belongs to the positive correlation with the Hb concentration (17). On the other hand, (18) showed that Sesame seeds increases FSH levels due to increasing the sex hormone binding globulin, (SHBG) plasma levels.(19) revealed that the increase in SHBG tends to decrease the plasma free estradiol level in women, this will reduces the negative feed back effects of estradiol on FSH release from the anterior pituitary, so that FSH level will continue at a high levels Increased FSH activity in the Sesame seeds treated groups may enhance the ovarian follicle maturation which is illustrated by the significant increase in yolk weight. As a result, a significant increase in the egg weight was recorded and it’s well known that as the egg weight increase, the shell weight will increase also. In conclusion, Sesame seeds treatment in laying hens will improve some physiological and productive parameters.

Table 1: Effect of feeding sesame seeds on some blood parameters in broiler breeder hens after 2 weeks of treatment.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>RBCs Million/mm³</th>
<th>Hb gm / 100 ml</th>
<th>PCV %</th>
<th>MCV micron</th>
<th>MCH picogram</th>
<th>MCHC %</th>
<th>WBCs Cell / mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.07 c ± 0.04</td>
<td>10.66 c ± 0.17</td>
<td>30.16 b ± 0.74</td>
<td>145.41 a ± 3.49</td>
<td>51.55 a ± 1.47</td>
<td>35.42 b ± 0.96</td>
<td>20100.0 a ± 235.23</td>
</tr>
<tr>
<td>Sesame</td>
<td>2.42 b ± 0.06</td>
<td>12.23 b ± 0.23</td>
<td>33.66 a ± 0.21</td>
<td>139.31 a ± 3.31</td>
<td>51.81 a ± 1.54</td>
<td>36.30 b ± 0.80</td>
<td>20633.33 a ± 270.39</td>
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<tr>
<td>250 mg /kg b.wt</td>
<td>3.14 a ± 0.08</td>
<td>14.46 a ± 0.35</td>
<td>32.83 a ± 1.04</td>
<td>104.75 a ± 6.50</td>
<td>46.50 a ± 4.20</td>
<td>2006.67 a ± 138.24</td>
<td></td>
</tr>
<tr>
<td>500 mg /kg b.wt</td>
<td>3.14 a ± 0.08</td>
<td>14.46 a ± 0.35</td>
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<td>46.50 a ± 4.20</td>
<td>2006.67 a ± 138.24</td>
<td></td>
</tr>
</tbody>
</table>

* All values are expressed as mean ± SE, 6 animals / group.

* Means with different superscripts are statistically (P ≤ 0.05) different.

Table 2: Effect of feeding sesame seeds on some blood parameters in broiler breeder hens after 4 weeks of treatment.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>RBCs Million/mm³</th>
<th>Hb gm / 100 ml</th>
<th>PCV %</th>
<th>MCV micron</th>
<th>MCH picogram</th>
<th>MCHC %</th>
<th>WBCs Cell / mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.06 c ± 0.06</td>
<td>10.83 c ± 0.18</td>
<td>28.83 b ± 0.30</td>
<td>140.38 a ± 3.79</td>
<td>53.81 a ± 1.10</td>
<td>39.20 b ± 1.51</td>
<td>16183.33 c ± 70.31</td>
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<tr>
<td>Sesame</td>
<td>2.58 b ± 0.02</td>
<td>12.53 b ± 0.21</td>
<td>32.83 a ± 0.79</td>
<td>127.91 b ± 5.29</td>
<td>49.65 b ± 1.35</td>
<td>38.28 b ± 1.41</td>
<td>19516.67 b ± 16.86</td>
</tr>
<tr>
<td>250 mg /kg b.wt</td>
<td>3.47 a ± 0.04</td>
<td>15.06 a ± 0.43</td>
<td>34.00 a ± 1.76</td>
<td>97.96 c ± 0.80</td>
<td>44.26 a ± 1.06</td>
<td>20600.00 a ± 13.90</td>
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<tr>
<td>500 mg /kg b.wt</td>
<td>3.47 a ± 0.04</td>
<td>15.06 a ± 0.43</td>
<td>34.00 a ± 1.76</td>
<td>97.96 c ± 0.80</td>
<td>44.26 a ± 1.06</td>
<td>20600.00 a ± 13.90</td>
<td></td>
</tr>
</tbody>
</table>

* All values are expressed as mean ± SE, 6 animals / group.

* Means with different superscripts are statistically (P ≤ 0.05) different.
Table 3: Effect of sesame seeds on some egg parameters in laying hens.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>egg weight, g</td>
<td>shell weight, g</td>
</tr>
<tr>
<td>Control</td>
<td>61.48 ± 1.39 b</td>
<td>6.86 ± 0.21 b</td>
</tr>
<tr>
<td>Sesame 250 mg /kg b.wt</td>
<td>63.56 ± 1.37 ab</td>
<td>6.68 ± 0.13 b</td>
</tr>
<tr>
<td>Sesame 500 mg /kg b.wt</td>
<td>66.15 ± 1.21 a</td>
<td>7.33 ± 0.08 a</td>
</tr>
</tbody>
</table>

Values are mean ± SE, 6 animals / group. Means with different superscripts are statistically (P ≤ 0.05) different.

Fig. 1: Effect of Sesame treatment (250 and 500 mg/kg) on LH level (miu/ml) in serum of broiler breeder hens.

Fig. 2: Effect of Sesame treatment (250 and 500 mg/kg) on FSH level (miu/ml) in serum of broiler breeder hens.

References


