EFFECT OF DIFFERENT LEVELS OF OLEOBIOTEC® ON PRODUCTION PERFORMANCE AND EGG QUALITY TRAITS IN JAPANESE QUAIL.

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ABSTRACT

This study was conducted at the Animal Production Sciences, College of Agricultural Engineering Science, University of Duhok to estimate the effect of different levels of oleobiotec on the production performance, egg quality of Japanese quail. A total of 105 Japanese quail 17 weeks of age obtained from a local farm and distributed into five treatments with three replicate for each one had (7 quail). Different doses of oleobiotec significantly (P ≤ 0.05) improved egg production, egg weight, and egg mass, fed conversion ratio and egg weight uniformity percentage. Concerning egg haugh unit significantly improved (P<0.05) by using oleobiotec while, other egg quality did not influenced with different level of oleobiotec.

Key words: Production performance, Egg quality, improvements egg production

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INTRODUCTION
The demand on ingredients of herbal in people daily life are growing, which is vice-versa will decrease the chemical addictive feed in the diets of poultry which is considered as a priority within the demand of producers. Several countries were added antibiotics to the feed, this affect the animals’ profitability negatively (18). The effect of benefit of various compound of bioactive are initiate to poultry production enhancement. The phytogetic term compound means a part from a plant (cinnamon, oregano, coriander, thyme, oregano, rosemary and garlic) especially their extracted essential oil. A lot of valuable properties especially phytogetic compound derived from molecules bioactive (linalool, cineole, carvacrol, thymol, piperine, allylisothiocynate, allicin, capsaicin and anethole) (11). Several researches have been published on the activities of phytobiotic in the nutrition of poultry such as coccidiostatic, antimicrobial, anthelmintic, immune stimulation and Stimulation of feed consumption (18), digestive enzyme enhancement (16), positively effects on the feed conversion and performance ratio, functions of antioxidant and antibacterial (24). Nowadays, the quail rearing has obtained an important role in the poultry production industry. Meat and egg consumption of quail has been raised and the healthy quail production is the demand of the consumer. The essential oil benefits on nutrition of animal include immune response activation, endogenous digestive enzyme secretion improvement and stimulation of appetite (5; 14; 15). There is some other essential oils as well as act as an anti-heat stress (10; 17). Many researches had revealed that the essential oils of herbs contain antibacterial activities especially in the digestive system of broiler (20; 25). This act is getting a greater attention, in particular broiler chickens (1; 2). The supplement dietary of essential oil considerably maximize the improved feed conversion and egg production comparing to the control (6). On the other hand, there is a digestibility ileal of phosphorus, crude fat, crude protein, crude ash and calcium revealed a linear rise in relate to the phytogetic addictive feed in the diet increase. Otherwise, the study on the hens that laying found the supplement diet with essential oil mixture of rosemary, sage and thyme (3) and mixture of essential oil improved eggshell quality, performance and immune response of laying hens (4). The essential oil mixture supplement also affected the eggshell thickness, egg mass and egg weight positively (22). In contrary, also study showed that various levels essential oil dietary had no effect on the egg shell weight, performance parameters and damaged eggs (21). However, (12) reported that the plant extract and essential oil as an additive phytogetic feed had a considerable effect on the laying quail performance; egg production and egg number per hen. Therefore the aim of this study in to investigate the effect of different dose of liquid oleobiotec® (contain carvecarol, clove essential oil, thymol, oregano) on laying quail performance.

MATERIALS AND METHODS
The present study was carried out at the poultry farm of Department of Animal Production, College of Agricultural Engineering Sciences, University of Duhok. 105 with 17 weeks old laying quails were randomly distributed to five treatments with three replicates for each one (7 quail). First treatment served as a control and other treatments received 30ppm, 40ppm, 50ppm, 60ppm of (Oleobiotec® Phode. France) in drinking water for an experimental period of 5 weeks. Quails were feed commercial ration containing 22% crude protein and 3000 kcal energy and feed 25g of ration for each quail/day. Egg number and individual egg weight were recorded daily for calculating egg production %, average egg weight, egg mass, FCR and uniformity percentage of egg weight. At the end of each week, 3 eggs from each replicate were chosen randomly for estimating egg quality traits.

Statistical analysis
All results were statistically analyzed by General Linear Models (GLM), one-way analysis of variance, using SAS software (23)

\[ Y_{ij} = \mu + T_i + e_{ij} \]

Where: \( Y_{ij} \) = Performance traits measured on the \( j \)th traits in the \( i \)th treatment.

\( \mu \) = Overall mean.

\( T_i \) = Effect of the treatments (i= 1, 2, 3,...).
eij = Random error effect.
Differences among means were separated using Duncan’s multiple range test (10).

RESULTS AND DISCUSSION

Egg production traits:
Figure 1 show the influence of different levels of Oleobiotec® on egg production percentage. All the treated groups were higher than control group during the entire period of study. Treated groups were increased steadily from first week of production until second week. Thereafter, they were decreased sharply until third week and increased again until fourth week of production. Then, they were slightly decreased until the end of the study. Among the treated groups, egg production percentage was higher in T4 during the entire period of study.

![Figure 1. Effect of Oleobiotec® levels on weekly egg production % of Japanese quail.](image)

Production performance:
Data in table 1 shows the effect of Oleobiotec® on hen-day egg production, egg weight, egg mass (g/quail) and feed conversion ratio (g feed/g egg). Data show significant effect of all treatments on the mentioned parameters except egg weight compared to control group. Hen day egg production was significantly higher in all treated groups compared with control group and the highest result was for T4. All used doses had significant effect on the egg mass compared to control group and was highest in T4 among treated groups. Regarding to FCR, T3 and T4 had significant effect compared to other groups. These results were in agree with the findings of Hanafy et al., (12) they found that using different doses of essential oil mixture in drinking water of Japanese quail had significant effect on laying rate and egg mass. Furthermore, Čabuk et al., (7) investigated that using essential oils containing thymol carvecor and oregano had significant effect on egg production % feed conversion ratio and not affected significantly on egg weight. Additionally, Olgun, (22) was obtained that using essential oils mixture improved egg production, egg mass and feed conversion ratio in laying hens. Moreover, result were in agreements with finding of Manafi et al.,(19) they found that adding phytogetic for quail significantly (P<0.05) increased egg production and feed conversion ratio. However, these results was in contrast with finding of Hanafy et al., (12) they found that using essential oil mixture had significant effect on the egg weight. Moreover, Hilmi et al., (13) mentioned that using phytogetic in Japanese quail nutrition had no significant effect on egg production %, egg mass and feed conversion ratio.
Table 1. Effect of Oleobiotec® levels on hen day egg production, egg weight, egg mass and FCR of Japanese quail.

<table>
<thead>
<tr>
<th></th>
<th>HDP *</th>
<th>Egg weight(g)</th>
<th>Egg mass g/bird</th>
<th>FCR g/g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over all</td>
<td>63.89 ±1.72</td>
<td>11.38 ± 0.07</td>
<td>258.47 ± 23.76</td>
<td>3.54 ±0.10</td>
</tr>
<tr>
<td>T1</td>
<td>47.28±2.95 ć</td>
<td>11.37±0.18 abc</td>
<td>208.35±13.53 ć</td>
<td>4.07±0.16 a</td>
</tr>
<tr>
<td>T2</td>
<td>62.85±3.58 b</td>
<td>11.75±0.17 a</td>
<td>258.93±17.24 ab</td>
<td>3.69±0.34 ab</td>
</tr>
<tr>
<td>T3</td>
<td>67.80±3.03 b</td>
<td>11.64±0.14 ab</td>
<td>276.68±13.85 ab</td>
<td>3.30±0.20 bc</td>
</tr>
<tr>
<td>T4</td>
<td>76.57±2.36 a</td>
<td>11.19±0.10 bc</td>
<td>299.98±10.95 a</td>
<td>2.97±0.11 c</td>
</tr>
<tr>
<td>T5</td>
<td>64.95±3.08 b</td>
<td>10.95±0.19 c</td>
<td>248.68±14.20 b</td>
<td>3.69±0.22 ab</td>
</tr>
<tr>
<td>P value</td>
<td>0.0001</td>
<td>0.0064</td>
<td>0.0004</td>
<td>0.011</td>
</tr>
</tbody>
</table>

*HDP = hen day egg production

Egg weight uniformity percentage

Results in table 2 show weekly and total egg weight uniformity percentage were significantly affected in almost all the treated groups compared to control group. T4 was significantly affected the weekly and total egg weight uniformity percentage during the entire period of the study. Till now there is no prove how essential oil increase egg weight uniformity this may be due to that essential oil let to increase digestibility of crude protein and crude fat in the ration (9), which lead to provide enough nutrients for eggs formation and make egg weight uniformity higher that control.

Table 2. Effect of Oleobiotec® on weekly and total egg weight uniformity1 % of laying Japanese quail.

<table>
<thead>
<tr>
<th></th>
<th>1st week</th>
<th>2nd week</th>
<th>3rd week</th>
<th>4th week</th>
<th>5th week</th>
<th>Total 5 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>38.73 ± 1.78</td>
<td>38.10 ± 1.64</td>
<td>38.25 ± 1.62</td>
<td>38.53 ± 1.6</td>
<td>38.60 ± 2.42</td>
<td>38.44 ± 0.80</td>
</tr>
<tr>
<td>T1</td>
<td>27.75 ± 1.20 ć</td>
<td>28.83 ± 0.28 b</td>
<td>30.88 ± 0.64 ć</td>
<td>32.49 ± 1.74 ć</td>
<td>30.68 ± 1.19 b</td>
<td>30.13 ± 0.61 ć</td>
</tr>
<tr>
<td>T2</td>
<td>38.98 ± 1.93 b</td>
<td>37.96 ± 1.23 a</td>
<td>37.46 ± 0.91 abc</td>
<td>35.15 ± 1.01 bc</td>
<td>37.86 ± 2.86 ab</td>
<td>37.48 ± 0.74 b</td>
</tr>
<tr>
<td>T3</td>
<td>39.02 ± 3.35 b</td>
<td>39.22 ± 3.58 a</td>
<td>36.60 ± 1.98 abc</td>
<td>36.49 ± 2.23 bc</td>
<td>40.27 ± 0.69 ab</td>
<td>38.32 ± 1.05 b</td>
</tr>
<tr>
<td>T4</td>
<td>46.38 ± 0.84 a</td>
<td>44.07 ± 3.68 a</td>
<td>45.50 ± 3.81 a</td>
<td>48.44 ± 1.98 a</td>
<td>48.21 ± 1.58 a</td>
<td>46.52 ±1.09 a</td>
</tr>
<tr>
<td>T5</td>
<td>41.54 ± 0.8 ab ab</td>
<td>40.40 ± 1.50 a</td>
<td>40.82 ± 3.82 ab</td>
<td>40.09 ± 0.54 b</td>
<td>36.01 ± 10.5 ab</td>
<td>39.77 ± 1.99 b</td>
</tr>
<tr>
<td>P value</td>
<td>0.0006</td>
<td>0.015</td>
<td>0.029</td>
<td>0.0004</td>
<td>0.23</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

1 = Percentage of eggs with ± 5% of mean egg weight.

Egg quality traits.

Results in table 3 show influence of various levels of Oleobiotec® on egg quality characteristics. All the studied parameters were not significantly affected in the exception to Haugh unit, in which it was significantly affected in treated groups compared to control group and it was recorded highest in T4 being 90.72. results were in agree with finding of Olgun, (22) who found that using essential oils mixture not affect significantly on the egg shell percentage. Moreover, Hilmi et al., (13) found using phytogenic in quail ration had no significant effect on albumen weight, albumen % yolk weight, yolk%, while had significant effect on Haugh Unit. Additionally, Çabuk et al., (7) investigated that using mixture of essential oils not affected significantly on shell and yolk weight of Japanese quail eggs. On other hand results were in contrast with findings of Hilmi et al., (13) they investigated that phytogenic had significant effect on shell weight and shell % of quail eggs. Furthermore, Çabuk et al., (7) obtained that mixture of essential oils have no significant effect on Haugh unit of Japanese quail eggs.
Table 3. Effect of Oleobiotec® doses on egg quality characteristics of Japanese quail.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>T1 (control)</th>
<th>T2 (30ppm)</th>
<th>T3 (40ppm)</th>
<th>T4 (50ppm)</th>
<th>T5 (60ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg weight (g)</td>
<td>12.40±0.10</td>
<td>12.35±0.10</td>
<td>12.77±0.16</td>
<td>12.56±0.27</td>
<td>12.08±0.37</td>
<td>12.23±0.10</td>
</tr>
<tr>
<td>Albumen weight(g)</td>
<td>4.99±0.12</td>
<td>4.50±0.53</td>
<td>5.14±0.21</td>
<td>5.20±0.17</td>
<td>4.82±0.06</td>
<td>5.27±0.15</td>
</tr>
<tr>
<td>Shell weight (g)</td>
<td>1.90±0.05</td>
<td>1.92±0.13</td>
<td>1.97±0.18</td>
<td>1.91±0.18</td>
<td>1.87±0.04</td>
<td>1.85±0.05</td>
</tr>
<tr>
<td>Albumen %</td>
<td>4.73±0.06</td>
<td>4.62±0.12</td>
<td>4.66±0.09</td>
<td>4.72±0.17</td>
<td>4.84±0.14</td>
<td>4.84±0.20</td>
</tr>
<tr>
<td>Shell %</td>
<td>38.26±0.55</td>
<td>37.43±1.13</td>
<td>36.55±0.64</td>
<td>37.54±0.88</td>
<td>40.21±1.56</td>
<td>39.56±1.42</td>
</tr>
<tr>
<td>HU</td>
<td>87.92±0.57</td>
<td>84.58±1.29</td>
<td>87.78±1.36</td>
<td>88.14±1.10</td>
<td>90.72±0.72</td>
<td>88.36±0.62</td>
</tr>
</tbody>
</table>

CONCLUSION
In conclusion supplement adding 50-60 ppm oleobiotec in drinking water of layer quails could improve egg production, egg weight, egg mass, feed conversion ratio and egg weight uniformity percentage.

REFERENCES