EFFECT OF GRINDED OLIVE LEAVE SUPPLEMENTATION IN MILK PRODUCTION AND ITS COMPONENTS AND SOME BLOOD TRAITS IN NATIVE DOES.

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ABSTRACT

The present study was carried out at the Animal Farm College of Veterinary Medicine University of Baghdad during the period from 20/4/2015 to 1/6/2015. This study was conducted to investigate the effect of olive leaves (grinded) supplementation to diet on milk yield, composition and some blood biochemical parameters. Ten local lactating goats and its mean initial live body weight 41.38± 0.46 kg, and 2-3.5 years old were allocated according to their body weight and milk yield into two groups (5 does/group). The first one (G1) was control, the second (G2) fed on diet with 2% olive leaves powder (of diet weight). The animals in both groups were fed the experimental diets 2% DM of live body weight plus alfalfa hay (1 kg/head/day). Results showed the olive leaves powder supplementation had no significant effect on the average body weight in the end of experiment, while the milk production was significantly (P<0.05) increased in (G2) being 13.68 kg/Doe compared with 10.76 kg/Doe (G1), milk compositions (lactose, protein and fat percentage) and milk energy value did not significantly different between (G1) and (G2). Moreover blood biochemical parameters did not differ in both groups. It can be concluded that olive leaves powder exerted have beneficial effects on the performance of lactating goats and no effect on blood biochemical parameters.

Key words: olive leaves, Milk yield and composition, Blood biochemical parameters, goats

المستخلص

نفذت هذه الدراسة للتعرف على تأثير إضافة مسحوق ورق الزيتون إلى عميقة اناث الماعز المحلي على كل من معدل إنتاج الحميب ومكوناته وبعض صفات الدم لدى إناث الماعز المحلي. تم اختيار عشرة من إناث الماعز المحلي بعمر يتراوح بين (2-3.5 سنة) وبوزن الجسم الحي (41.38 كجم) وتم تربيتها داخل الحقل الحيواني لكلية الطب البيطري، جامعة بغداد، لمدة فترة من 20/4/2015 إلى 1/6/2015 (5 ماعز). قسمت إناث الماعز عشوائيا بعد أقممتيا لمدة عشرة أيام إلى مجموعتين متساويتين (5/ماعز). تم تغذية المجموعة الأولي (G1) تم تغذية المجموعة الثانية (G2) عمى عميقة مضافا إليها 2% من وزن الجسم من مسحوق أوراق الزيتون. تم تغذية كافة إناث الماعز في المجموعتين عمى العميقة المركزة بواقع 2% من وزن الجسم مضافا إليها دريس ألجت بواقع 1 كغم/معزة/يوم. لم تظهر النتائج في نهاية التجربة وجود اختلافات معنية بين المعاملات في أوزان إناث الماعز. بينما ارتفع معدل إنتاج الحميب معنويًا في (G2) إذ بلغ 13.68 كغم/معزة مقارنة بحواليات المجموعة الأولى (السيطرة) إذ بلغ معدل إنتاجها 10.76 كغم/معزة. كانت الفروقات غير معنوية بين حيوانات المجموعة الأولى والثانية في النسب المئوية لمكونات الحليب (الكالسيوم والبروتينات والدهون) وكذلك في الطاقة المفرزة بالحليب بالإضافة إلى ذلك كانت الفروقات غير معنوية في معايير الدم الكيميائية بين المجموعتين تستنتج مما سبق أن تأثير الممتحنة على مكونات الحليب وصفات الدم.
INTRODUCTION
The feed additives, such as antibiotics have been widely used in ruminant production systems for many years to improve feed conversion ratio and daily gain. However, the antibiotics added to the animal nutrition has been prohibited in the European Union due to the fact that the antibiotic intake for long period lead to resistant bacterial strains and the risk of antibiotic residues in milk and meat products exists (7, 20). Feeding lactating ruminants with olive leaves can have a positive effect in the quality of the milk production and improve the acidic composition of the lipid fraction by oxidative stability (8,22). Furthermore, olive leaf and its individual constituents can be consumed by human and animal due to its important effect on health and considered safe and non-toxic (7). However, the ability of olive leaf content has important effect on microbial fermentation processes in the rumen (21). Does have a high ability to cope and live in most countries of the world, in addition the goats milk have important effect for patients, who have digestive problems or who are unable to tolerate cow's milk (3, 6, 12). The Olive leaves consider rich sources of antioxidants (such as oleuropein and hydroxytyrosol, as well as several other polyphenols and flavonoids, including oleocanthal. Elenolic acid which have positive effect on improving animal performance (5, 10). Although olive tree is widely cultivated in Iraq for production of edible fruits and as ornamental tree, but no/or little information is existed on the use of olive trees leaves in small ruminant feeding. Therefore, this study was under taken to investigate the effect of dietary olive leaves powder supplementation to does diet and its effect on milk yield and composition and some blood biochemical parameters in local does.

MATERIALS AND METHODS
The Present study was carried out at the Animal Farm pertaining to the College of Veterinary Medicine, University of Baghdad during the period from 20/4/2015 to 1/6/2015. Ten local lactating does (41.38± 0.46 kg live body weight and 2-3.5 years old) were allocated according to their body weight and milk yield into two groups (5 does/group). The first one (G1) was control, the second (G2) fed diet with 2% from diet olive leaves powder. The animals in both groups were fed the experimental diets as 2% DM of live body weight plus alfalfa hay (1 kg / head/day). Animals were weighed weekly. The milk yield was recorded weekly at the morning and evening. Milk samples were determined for fat, protein, lactose and total solid concentrations (4), Blood biochemical attributes, were measured during the experiment within every ten days. Blood samples (5 ml) were withdrawn via jugular venipuncture into vacationer tubes from each animal. Blood samples were centrifuged and collected the blood serum and stored at (-20°C). Thereafter to determine Blood total protein .Biuret colorimetric method, Linear Chemicals, Croma test, 1153005. Barcelona-Spain. Blood urea nitrogen: Modified Urease-Berthelot method, Randox. UR 2316, Antrim, UK. Blood triglycerides :Fossati and Prencipe method associated with Trinder reaction. Biolabo SA, 80019, Maizy, France. Blood glucose was measured by standard methods using commerical kits supplied from Rosche Diagnostics (D-68298, Mannheim, Germany). Milk energy values were calculated according to Economides (11) using the following equation (Calorific value (MJ/kg) = 1.64+ 0.42 × fat %). The experiment lasted 5 weeks after seven days adaptation period. Before the starting of the experiment, the olive leaves were collected from trees in Baghdad and dried at room temperature 25°C for three days (9). Table 1 and 2 shows the formulation and chemical compositions of the experimental diets were used.

Statistical analysis:
Mean values and standard errors were calculated and the results were compared statistically using student’s t-test to asses the differences between control and treated animals (24).

| Table 1. Chemical Analysis of olive leaves (% on DM basis) |
|-----------------------------------------------------------|
| Parameters | Values (%)   |
| Dry matter | 96.7  |
| Crude      | 7.9   |
| protein    |       |
| Crude fat  | 2.1   |
| Crude fiber | 19.1 |
| ASH        | 4.9   |
| NFE        | 62.7  |

Calculated according to Christakis et al (9).
Table 2. Experimental feed composition and their chemical analysis (% on DM basis)

| Items            | Control | Treatment | Parameters | Chemical analysis
|------------------|---------|-----------|------------|-------------------|
|                  |         |           | Dry Matter | Control   | Treatment   |
| Barley grains    | 50      | 50        |            | 91.63     | 91.72       |
| Wheat bran       | 26      | 24        | Organic Matter | 91.23     | 91.30       |
| Soybean meal     | 8       | 8         |            | 12.55     | 12.37       |
| Maize            | 5       | 5         | Crude Protein | 3.83      | 3.76        |
| Minerals & Vitamins | 2     | 2         | Ether Extract | 8.72      | 8.74        |
| Olive leaves powder | 0     | 2         | Ash        | 0.40      | 0.43        |
| Alfalfa hay      | 9       | 9         | Nitrogen free Extract | 74.5     | 74.77       |
|                  |         |           | Metabolisable | 11.97    | 11.85       |
|                  |         |           | Energy (MJ/Kg DM) |          |             |

Calculated according to Kearl (17).

ME (MJ/kg DM)= [- 0.45 + ( 0.04453×% TDN)] × 4.184

TDN for energy feeds (% of DM) = 40.3227+0.5398 % CP+0.4448 % NFE+1.4218 % EE–0.7007 % CF

RESULTS AND DISCUSSION

The results of the current study are presented in Table 3. These results showed that no significant differences on the effect of dietary olive leaves powder supplementation on does weights. The final does weights were 44.13 and 45.0 kg for G1 and G2 respectively. While there were significant differences(P≤0.05) for the treated group as compared with control group in the average daily milk yield between treated group 391 g/d and control 307 g/d. The average total milk yield was ranged between 13.68 and 10.76 kg/doe. These findings are consistent with other studies (14,23) which found that olive leaves contain a higher oleurope in amounts, which are polyphenols that enhance unique animal health and have impact on the average body weight and milk production and increasing the allowance metabolic rate of carbohydrates and it because of the positive effect on the rumen environment. Similar results concerning body weight were observed by Al-Absawi (2) who showed that olive leave supplementations lead to improvement in the goat kids body weight. Whereas, Jenkins and McGuire (15) referred to increased milk yield by increasing the energy intake and better utilization of the energetic quota by the goat which had the diet contain olive leave. Previous studies indicated that using olive byproducts in ruminant diet resulted in increased milk yield (8,18). The improvement in does performance could be attributed that olive leaves may act as rumen modifier which alter rumen fermentation. It was found recently that olive leaf extract that confer positive effects of olive leaf extract on microbial population and fermentation in the rumen (13).

Table 3. Effect of dietary olive leaves supplementation on the productive performance of native does (mean±SE)

| Parameters                        | Treatment     | groups       |
|-----------------------------------|---------------|--------------|
| Initial body weight (IBW) kg      | G1 (control)  | G2 (treated) |
| Final body weight (FBW) kg        | 41.38±0.37    | 41.38±0.56   |
| Average daily milk yield g/d/goat | 307.5±0.72b   | 391.0±0.45a  |
| Average total milk yield kg/goat  | 10.76±0.78b   | 13.68±0.74a  |
| Energy value in milk MJ/k         | 3.59±0.22     | 3.84±0.49    |
| Energy value in milk MJ/D         | 1.10±0.31     | 1.50±0.62    |

Different letters in the same row denoted significant differences between treated groups and control at level P<0.05. Table 4 shows chemical composition of the milk samples during the experiment. The protein percentage was highest in the “control group” as compared with the treated group in spite of no significant differences between them, due to
an effect of dilution which correlated with a large milk yield in the “treated group” (8, 16). Non-significant differences were observed for the (lactose and fat) percentages between groups despite the improvement in treated group, while the quantity (gram per day) is significant (P≤0.05) of milk fat, lactose and protein in the G2 group owing to the increase of the daily yield as compare with control group. Similar results concerning milk composition were observed by many studies (8,19,22).Urea content of the milk of the two groups is similar to those results obtained by Pauselli et al.(22), reported that the supplementation olive leave in the diet did not alter the urea level in ewes milk.

Table 4. Effect of dietary olive leave supplementation on milk composition of native does (mean ± S.E.)

| Parameters                      | Treatment   | groups       |
|---------------------------------|-------------|--------------|
|                                 | G1(control) | G2(treated)  |
| Lactose (%)                     | 3.00±0.87   | 3.72±0.03    |
| Lactose (g/d)                   | 9.22±0.19   | 14.54±0.64   |
| Fat (%)                         | 3.66±0.41   | 4.29±0.21    |
| Fat (g/d)                       | 11.25±1.8   | 16.77±0.94   |
| Protein (%)                     | 3.30±0.11   | 3.26±0.2     |
| Protein (g/d)                   | 10.15±0.32  | 12.75±0.15   |
| Urea milk concentration mg/100ml| 12.91±1.15  | 12.11±0.53   |

Different letters in the same row denoted significant differences between treated group and control at level P<0.05.

Table 5 showed the effect of dietary olive leave powder for the does on some blood biochemical parameters. These result revealed that there was no significant differences between treated and control groups in the average concentration of blood glucose being averaged value between 73.70–66.77mg/100mL, cholesterol between69.01-66.70mg/100, triglyceride between 14.57–12.16 mg/100mL, while the total protein 6.01–6.04g/100mL and serum urea between 14.29–13.07mg/100mL respectively. These results agree with other previous studies (2,1), but disagree with results obtained by Chrastaki, et al. (9) who found that ‘olive leave’ suppletions lead to increase total serum proteins and serum urea. The glucose, cholesterol and triglyceride levels in olive leaves group showed the best picture in these parameters, where the treatments led to decreasing in the levels of these parameters in second group as compared with control group. Similar results concerning glucose, cholesterol and triglyceride were observed by many studies (2, 25).

Table 5. Effect of olive leave supplementation on blood biochemical parameters of native does (mean ± S.E.).

| Item             | Treatment         | groups         |
|------------------|-------------------|----------------|
|                  | G1 (Control)      | G2 (Treated)   |
| Blood biochemical parameters |                   |                |
| Glucose (mg/100ml) | 73.70±1.9         | 66.77±2.74     |
| Protein (g/100ml) | 6.01±0.11         | 6.04±0.08      |
| Urea (mg/100ml)  | 14.29±1.58        | 13.07±1.14     |
| Cholesterol (mg/100ml) | 69.01±5.26     | 66.70±2.18     |
| Triglyceride(mg/100ml) | 14.57±1.67      | 12.16±0.89     |

It can be concluded that olive leaves powder exerted have beneficial effects on the performance of lactating goats and no effect on blood biochemical parameters. However, further works are needed to investigate the olive leaves effect on rumen fermentation of goats.
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