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

J. E. AL-Musawi[1@] A.F. AL-Khalisy.[2] H., K. Ibraheem[3]
Lecturer Asst. Prof Asst. Prof
[1,2,3]Dept. Public Health,Coll. of Vet. Med., Baghdad University
dr.jassimalmusawi@gmail.com

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 to1/6/2015. 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 weight41.38± 0.46 kg, and 2-3.5 years old were allocated according to their body weight and milk yield into two groups (5does/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 different 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:oliveleaves ,Milk yield and composition, Blood biochemical parameters .goats

تاثير إضافة ورق الزيتون المطحون إلى العليقة في إنتاج الحليب ومكوناته وبعض صفات الدم لدى إناث الماعز المحلي

جاسم عيدان الموسوي عباس فوزي صادق هديل خليل ابراهيم
مدرس استاذ مساعد استاذ مساعد
فرع الصحة العامة,كلية الطب البيطري, جامعة بغداد
dr.jassimalmusawi@gmail.com

المستخلص

نفذت هذه الدراسة للتحري عن تأثير إضافة مسحوق ورق الزيتون الى غذاء اناث الماعز المحلي على كل من معدل إنتاج الحليب ومكوناته وبعض المعايير الدمية والفسلجية.تم اختيار عشرة من إناث الماعز المحلي بعمر يتراوح بين (2–3.5سنة) وبمعدل وزن الجسم الحي (41.38 كيلوغرام) وهي في وسط مرحلة الحليب وتم تربيتها داخل الحقل الحيواني لكلية الطب البيطري / جامعة بغداد للفترة من 2015/4/20 إلى 2015/6/1 .قسمت اناث الماعز عشوائيا بعد أقلمتها لمدة عشرة أيام إلى مجموعتين متساويتين (5 ماعز / مجموعة) وتم تغذية المجموعة الاولى (G1) اي السيطرة على العليقة الخالية من مسحوق ورق الزيتون بينما تم تغذية المجموعة الثانية (G2) على عليقة مضافا إليها 2% من العليقة مسحوق أوراق الزيتون.تم تغذية كافة إناث الماعز في المجموعتين على العليقة المركزة بواقع 2% من وزن الجسم الحي مضافا إليها دريس ألجت بواقع 1كغم /معزة/يوم .لم تظهر النتائج في نهاية التجربة وجود اختلافات معنوية بين المعاملات في أوزان إناث الماعز ، بينما ارتفع معدل إنتاج الحليب معنويا (P≤0.05) في حيوانات المجموعة الثانية إذ بلغ 13.68 كغم /معزة مقارنة بحيوانات 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 (اللاكتوز والبروتين والدهن) وكذلك في الطاقة المفرزة بالحليب بالإضافة إلى ذلك كانت الفروقات غير معنوية في معايير الدم الكيموحيوية بين المجموعتين.نستنتج مما سبق بان تدعيم العليقة بمسحوق ورق الزيتون لإناث الماعز أدى إلى تحسين معدل إنتاج الحليب دون التاثير على مكونات الحليب اوصفات الدم .

الكلمات المفتاحية: اوراق الزيتون ،انتاج الحليب ومكوناتة ،اختبارات الدم البايوكيميائية،ماعز

INTRODUCTION

The feed additives, such as antibiotics have been widely used in ruminant production systems for many year 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 to1/6/2015.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 (5does /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 as2 % 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^{o}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 suppliedfrom 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 25C for three days (9). Table 1and 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 protein	7.9
Crude fat	2.1
Crude fiber	19.1
ASH	4.9
NFE	62.7

Calculated according to Christaki*et al* (9).

Table 2. Experimental feed composition and their chemical analysis (% on DM basis)

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

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 andG2 respectively. While there were significant differences($P \leq 0.05$)for the treated group as compared with control group in the average daily milk yield between treated group 391g / d and control 307 g / d. The average total milk yield was ranged between 13.68 and10.76 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	
	G1 (control)	G2 (treated)
Initial body weight (IBW) kg	41.38±0.37	41.38±0.56
Final body weight (FBW) kg	44.13±0.76	45.0±0.21
Average daily milk yield g/d/goat	307.5±0.72^{b}	391.0±0.45^{a}
Average total milk yield kg/goat	10.76±0.78^{b}	13.68 ±0.74^{a}
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[b]	14.54±0.64[a]
Fat (%)	3.66± 0.41	4.29± 0.21
Fat (g/d)	11.25±1.8[b]	16.77±0.94[a]
Protein (%)	3.30±0.11	3.26±0.2
Protein (g/d)	10.15 ±0.32[b]	12.75± 0.15[a]
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 Chrestaki,*et.al* (9) who found that 'olive leave' supplementations 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 onblood biochemical parameters of native does (mean ± S.E.).

Item	Treatment groups	
Blood biochemical parameters	G1 (Control)	G2 (Treated)
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.

REFERENCES

1.Afaf, M. , M. A. El-Ashry and A. Hend. 2009. Effect of feeding olive tree pruning by-products on Sheep Performance in Sinai. World J. Agri. Sci. 5 (4): 436-445.

2.Al-Absawi, M. K. 2014.Effect of using olive leaves (*Oleaeuropaea*) powder and /or vitamins AD_3E on productive performance, rumen environment and blood traits in Iraqi goat kids. MSc. theses. College of Veterinary Medicine. University of Baghdad. P:91-96.

3.Andrea, S. W. 2012.Cow milk consumption, insulin-like growth factor-I, and human biology: A Life History Approach, Original Research Article .Am. J. Hum. Biol. 24:130 - 138.

4.AOAC. 2006. Official Methods of Analysis of the Association of Official Agricultural Chemists. Washington .D.C, USA. 1:102-771.

5.Beecher, G. R. 2003. Overview of dietary flavonoids: Nomenclature, occurrence and intake. J. Nutr. 133: 3248S-3254S.

6.Ciappesoni, G. , J. Pribyl, M. Milerski and V. Mares .2004. Factors affecting goat milk yield and its composition .Czech J. Anim. Sci., 11: 465-473.

7.Castillejos, L. , S. Calsamiglia, J. Martín-Ereso and H. Ter-Wijlen. 2008. In vitro evaluation of effects of tenessential oils at three doses on ruminal fermentation of high concentrate feedlot-type diets. Anim Feed Sci. Technol,145:259-270.

8.Chiofalo, B., L. Liotta. , A. Zumbo and V. Chiofalo. 2004. Administration of olive cake for ewe feeding: effect on milk yield and composition. Small Rumin. Res. 55: 169–176.

9.Chrestaki, E., E. Bonos and P. Florou-Paneri. 2011. Effect of dietary supplementation of olive leave and /or a-Tocopheryl acetate on performance and egg quality of laying Japanese Quail (*coturnix japonica*), Asian J. Anim. Vete. Advances, 6(12): 1241 -1248.

10.Covas, M.I. 2008. Bioactive effects of olive oil phenolic compounds in humans reduction of heart disease factors and oxidative damage. Inflammopharmacology. 16:216–221.

11.Economides, S. 1986. Comparative studies of sheep and goat milk yield, composition and growth rate of lambs and kids. J. Agric. Sci. (Camb), 106: 477-484.

12.FAO .2010. 'FAO Statistical Yearbook 2010.' (Food and Agriculture Organization of the United Nations: Rome) Available at http://www.fao.org/docrep/015/am081m/am081m00.htm.

13.Hakan, O. , D. Ahu , S. Yasemin, P. Mert and E. Bahri .2012. Effects of olive leaf extract on rumen microbial fermentation in *in vitro* semi-continuous culture system (RUSITEC) Ankara Üniv Vet FakDerg, 59: 17-21.

14.Jemai, H., M. Bouaziz, I. Fki, A. El-Fekiand , and S. Sayadi .2008. Hypolipidimic and antioxidant activities of oleuropein and its hydrolysis derivative-rich extracts from Chemlali olive leaves. ChemBiol Interact. 25: 176(2-3):88-98.

15.Jenkins, T. C. and M. A. McGuire. 2005 . Effect of Nutrition on Milk composition A 25-Years Review of Research Reported In The Journal of Dairy Science. Tri-State Dairy Nutrition Conference. 88: 2604-2615.

16.Kamal, N. S., S. A. Doskyand T. Layla.2012. Effect of protected soybean meal on milk yield and composition in local meriz Goats. J. of Agric. University of Duhok. Duhok, Iraq .40(1):1-10.

17.Kearl, L.C. 1982. Nutrient Requirement of Ruminant In Developing Countries. Logan: Utah Stat Uni. P: 117-118.

18.Lanzani, A., P. Bondioli, L. Folegatti, E. Fedeli, V. Bontempo, V.Chiofalo, G.Panichi and V. Dell'Orto. 1993 . Integrated olive husks applied to the sheep feeding: influences on the quali-quantitative production of milk. Riv. Ital. Sost. Grasse. 70: 375–383.

19.Nefzaoui, A. and M.V anbelle .1986. Effects of feeding alkali-treated olive cake on intake, digestibility and rumen liquor parameters. Anim Feed Sci .14:139–149.

20.Oeztuerk,H. and V. Sagmanligil. 2009 . Role of live yeasts on rumen ecosystem. Dtsch Tierarztl Wochenschr,116: 244-248.

21.Ozturk,H. A., Demirtas, Y. Salgirli, M. Pekcan, B.Emre and R. Fidanci. 2012. Effects of olive leaf extract on rumen microbial fermentation in *invitro*semi-continuous culture system. Ankara Üniv Vet FakDerg, 59: 17-21.

22.Pauselli, M., M.Servili, S., Esposto, G. Gervasi, E. Mourvaki, A.Taticchi, S. Urbani, R. Selvaggini, L. Concezzi and G. Montedoro. 2007. Effect of destoned olive cake as animal feed on ewe milk quality. ProcInt Conf. "New technologies for the treatment and valorization

of agro by-products", ISRIM, Terni, 3–5 Oct. 109:261-264.

23.Poudyal, H., F. Campbell and L. Brown.2010. Olive leaf extract attenuates cardiac, hepatic, and metabolic changes in high carbohydrate-, high fat-fed rats. J Nutr.; 140 (5):946-53.

24.Snedecor, G.W. and W.G. Cochran .1982 . Statistical Methods, 6th edition Iowa state University ,P: 1881-1974.

25.Wang, Y.M., J. H. Wang, C. Wang, J. K. Wang, J. Chen, X. Liu, H.Cao and F. C.Guo. 2010. Effect of dietary antioxidant and energy density on performance and antioxidative status of transition cows. Asian-Aust. J. Anim. Sci. 23(10):1299-1307.