J. Agric. Sci. Mansoura Univ., 33 (3): 1831 - 1841, 2008

EVALUATION OF OLIVE PULP WASTE FOR EGYPTIAN LACTATING BUFFALOES

Moustafa, S. M. S.[1]; A. A. S. Mahgoub[2]; M. T. Sallam[1]; A. A. Abd El-Ghani[1] and T. A. Deraz[2]

[1] Dept. of Anim. Prod., Fac. Agric., El-Minia Univ.

[2] Anim. Prod., Research Institute, Cairo, Egypt.

ABSTRACT

This study was carried out at the Animal Production Research Station of Sids to evaluate the effects of substituting 10, 20 and 30% of the concentrate feed mixture (CFM) by olive pulp cake on the nutritive values by sheep and milk production and it's composition of lactating buffaloes. Digestibility trials were conducted using 12 rams to evaluate the feeding values of the experimental rations. The control diet (R1) was containing the concentrate feed mixture (CFM), while R2, R3 and R4 contained 10, 20 and 30 % olive cake pulp, respectively on the account of CFM of R1. Urea was added fresh at a rate of 0, 40, 80 and 130 g / head / day to equalize crude protein contents in tested rations. Sixteen lactating buffaloes were divided into four groups and fed on the experimental rations (R1, R2, R3 and R4) for 112 days. In both experiments, the animals were fed on 1.5, 1.0 and 1.0 % of their live body weight CFM, berseem hay and rice straw, respectively. Crude protein (CP) content was decreased by increasing olive pulp in the ration. Ration 4 had lower CP, but higher EE than the others. Significant *(P < 0.05)* differences in digestibility of CP among treatments were recorded. Significant *(P < 0.01)* differences in DCP among all treatments were also recorded.

The values of total DM intake (kg / head / day) and (kg DM /100 kg body weight) were increased as olive pulp portion increased in the diet. Insignificant difference (*P > 0.05*) was found in total DM intake among all groups of buffaloes. Actual and 7 % fat-corrected milk yields show that the differences among treatments in milk yield were insignificant. The results indicated significant differences (*P < 0.05*) among treatments in milk fat %. The values were 6.3, 6.3, 6.6 and 6.1 kg / day for R1, R2, R3 and R4, respectively. In the present study, there were insignificant differences among treatments for milk protein content, milk total solids (TS) and solids not fat (SNF) percentages. Animals fed R3 (20 % olive pulp) showed the highest economical efficiency followed by R4 (30 % olive pulp) and R2 (10 % olive pulp) compared to the control diet. The lowest feed cost / 1 kg 7 % FCM was recorded for R3 followed by R4, R2 and the control group. It is clear that replacing up to 20 % of the CFM by olive pulp increased milk yield and economical efficiency than the control ration.

Keywords: Olive pulp, sheep, feeding values, lactating buffaloes milk yield, and milk composition.

INTRODUCTION

The olive pulp is an important by-product that may be used to constitute available supplemental rations during the forage-deficit seasons. Olive is cultivating extensively in the new reclaimed areas in Egypt. After extracting oil, its by-products are being available in appreciable quantities and at relatively low price. Incorporation of the cheap untraditional feedstuffs such as olive by–products in ruminant diets could participate in solving the problem of feed shortage. It may also decrease the cost of feed and

alleviate the pollution of the environment. Olive by-products are considered as one of the most promising untraditional feed ingredient for feeding animals. The olive by-products have been successfully fed to sheep and goats in Egypt (Youssef *et al.,,* 2001 and Fayed *et al.,* 2001). With pregnant and lactating ewes under the drought season, Youssef *et al.* (2001) recommended up to 40 % olive pulp in their concentrate mixture to improve their performance. Olive contains 8 – 15 % crude protein and 30 – 40 % crude fiber, which are believed to be one of the limiting factors in animal feeding (Francisco *et al.,*1989). Therefore, this experiment was carried out to investigate the effect of feeding olive wastes at 10, 20 and 30 % of the concentrate feed mixture on nutrients digestibility of sheep and milk production and milk composition by lactating buffaloes.

MATERIALS AND METHODS

Experimental rations:

This study was conducted at Sids Animal Production Research Station, Beni-Sweef governorate to investigate the effects of feeding different levels of olive pulp as a partial replacer of concentrate feed mixture (CFM) on nutrients digestibility and feeding values by sheep, as well as milk yield and milk composition in lactating buffaloes. Olive pulp has been bought from (El-Shalhya factory, Sharkia governorate). The rest of dietary ingredients were purchased from the local market. The experimental ration used was fed at a rate of 1.5 % of live body weight as CFM contained 0, 10, 20 and 30 % of olive pulp for rations R1, R2, R3 and R4, respectively and 1.0 % of live body weight of each of rice straw and berseem hay (Table, 1). Urea was added fresh at a rate of 0, 40, 80 and 130 g / head / day at feeding to equalize crude protein contents in the experimental rations.

Digestibility trials:

Four digestibility trials were conducted to evaluate the digestibility and nutritive value of the experimental rations. Three Ossimi rams averaged body weight 45 ± 1.5 kg were used in each trial. Rams were placed in metabolic cages in complete randomized block design. Each digestibility trial was extended for 14 days as a preliminary period followed by 7 days collection period. Rations were offered twice a day at 8 am and 4 pm, fresh water was freely available in front of animals in each cage. Through the collection period, the residuals of feeds were weighed daily in the morning at 8 am before feeding to calculate the daily amounts of feed consumption, while faces were quantitatively collected once a day at 8 am, and weighed. Representative samples of feed and feces were taken daily, immediately frozen at - 30$^{C^\circ}$. At the end of the collection period, a composite sample for each ram was prepared, dried in a drying oven at 65$^{C^\circ}$ for 16 hours, grind and stored in suitable jar for proximate analysis.

Productive performance trial:

Sixteen lactating buffaloes in their 3rd - 5th lactation seasons were chosen randomly and divided into four groups (four animals each) to investigate the effect of the dietary treatments on milk production and its

composition. Each group was approximately equal in their initial average live body weight (LBW) and milk yield. At the beginning of the experiment, all buffaloes just passed the lactation peak (6 to 8 week) after parturition. Animals were weighed in the morning before feeding at the starting of the experiment and once every month to the nearest kg and lasted for 112 days. Rations were offered at 8.00 am and 4.00 pm every day and water was offered three times daily. Feed intake and milk production were recorded daily, 7 % fat corrected milk was calculated according to the equation of Rafat and Saleh (1962).

Buffaloes were hand milked twice daily (7 am and 4 pm) during the experimental period (112 days), milk yields were recorded individually at each milking. Feed efficiency was expressed as production efficiency, which was calculated as the amount of the 7% FCM per 1 k g of consumed feeds as DM and TDN. Milk samples were collected individually twice a month and used to determine milk constituents of protein, fat, total solids, lactose and ash.

Laboratorial analysis:

Representative samples of olive pulp, concentrate mixture, berseem hay and rice straw as well as feces were analyzed for DM, CP, EE, CF and ash according to AOAC, (1990). Nitrogen free extract (NFE) was calculated by difference.

Milk fat content was determined by the standard Gerber's method as described by Ling (1963). Milk protein content was determined using micro-kjeldahle method (N×6.38). Total solids (TS) percentage in milk was estimated by weighing 5 ml of milk for initially drying on sand bath for evaporating the excess water, then drying was completed in drying oven at 100 C° for three hours. Ashing was performed by adding ashless paper to the milk sample (about 5 g) in a crucible, at 80C° overnight, then ached at 550 - 600C° in a muffle furnace for 3 hours. Lactose values were derived from the total solids - (fat, protein and ash). Solids-Not fat (SNF) was calculated by difference between total solids and fat content.

Statistical analysis:

Statistical analysis was performed using General Linear Models (GLM) procedure of SAS system (1998). The significance between treatment means was tested by multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Rations formulation and proximate analysis of rations:

Feeding rates as % of live body weight of the tested rations are presented in Table (1). Proximate chemical analysis of feedstuffs is shown in (Table 2) indicated that the olive pulp had higher values of OM, EE and CF than the concentrate feed mixture (CFM). The values were 97.00, 6.32 and 21.54 % for olive pulp *vs*. 93.95, 2.80 and 11.46 % for CFM, respectively. On the other hand the values of CP and ash contents of olive pulp were lower than those of the concentrate mixture, being 6.44 and 3.00 % *vs.*16.07 and 6.05 %, respectively.

Table (1) Feeding rates as % of animal live body weight of tested rations.

Items	Rations			
	R1	R2	R3	R4
Concentrate feed mixture	1.5	1.35	1.20	1.05
Olive pulp	0.0	0.15	0.30	0.45
Berseem hay	1.0	1.00	1.00	1.00
Rice straw	1.0	1.00	1.00	1.00

Table (2): Proximate analysis of feed ingredients and tested rations.

Items	DM	DM composition (%)					
		OM	CP	EE	CF	NFE	Ash
CFM	90.12	93.95	16.07	2.80	11.46	63.62	6.05
Olive pulp	88.03	97.00	6.44	6.32	21.54	62.70	3.00
Rice straw	92.04	85.78	3.00	1.26	31.95	49.57	14.22
Berseem hay	91.94	87.42	12.52	1.93	29.42	43.55	12.58
Ration 1 (R1)	91.19	89.75	11.32	2.11	22.45	53.87	10.25
Ration 1 (R2)	91.10	89.88	10.91	2.26	22.88	53.83	10.12
Ration 1 (R3)	91.01	90.01	10.50	2.41	23.31	53.79	9.99
Ration 1 (R4)	90.92	90.14	10.08	2.56	23.74	53.76	9.86

CFM = Concentrate feed mixture composed of 22% decorticated cotton seed meal, 35% yellow corn, 20% wheat bran, 15% soybean meal, 5% molasses, 2% ground limestone and 1% common salt.

The proximate analysis of the experimental rations are shown in Table (2). The control ration (R1) had higher DM % than R2 , R3, and R4 because of the slightly higher moisture content in olive pulp. Ration 4 had lower CP and ash contents but higher EE than other rations, this is mainly due to increasing olive pulp inclusion in R4 than rations 2 and 3. These results are in agreement with those of Fayed *et al.,* (2001), Kholif *et al.,* (2001) and Mostafa *et al.,* (2003).

Digestibility coefficients and nutritive values:

Digestion coefficients of the experimental rations are presented in Table (3). Insignificant differences were observed among R1, R2, R3 and R4 in the digestibilities of DM, OM, EE, CF and NFE. However, R4 showed the lowest digestibility coefficients for DM, OM CP, EE and NFE. The difference in CP digestibility in R4 and the control ration was significant ($P \leq 0.05$). These results are in agreement with those of Fayed *et al.,* (2001), Abd El-Rahman, *et. al.*, (2003) and Mostafa *et al.,* (2003). They reported that the digestibility coefficients of nutrients were decreased with increasing olive pulp inclusion in the diet. Generally, the digestibilities of nutrients had the highest values when R1 (control) was fed.

Nutritive values expressed as total digestible nutrients (TDN), starch value (SV) and digestible crude protein (DCP) of the experimental rations are presented in Table (3). Insignificant differences were observed among R1, R2, R3, and R4 considering TDN and SV, while significant ($P \leq 0.01$) differences of DCP among all treatments were shown. The highest value of TDN was recorded for R1 (control) followed by R3 and R2, while R4 showed

the lowest value. The best value of SV was recorded for R1 (65.95), while R4 recorded the lowest value (62.41), this might be due to high level of olive pulp in R4 that showed the lowest digestibility coefficients, the greater percentage of CF and the lowest concentration of CP. The highest value of DCP was recorded with R1 (control) followed by R2 and R3, while R4 showed the lowest value.

Table (3): Digestion coefficients and feeding values by sheep fed on different levels of olive pulp.

Items	Rations®				±SE
	R1	R2	R3	R4	
Dry matter digestibility	74.50	75.88	74.77	70.78	1.61^{NS}
Omatter digestibility	76.31	75.87	75.62	71.82	1.66^{NS}
Crude protein digestibility	76.17^{a}	69.33^{ab}	70.18^{ab}	63.69^{b}	2.25^{*}
Ether extract digestibility	87.81	87.32	87.95	86.79	0.86^{NS}
Crude fiber digestibility	72.82	74.06	70.97	71.71	1.69^{NS}
Nitrogen free extract digestibility	77.21	77.47	78.09	72.70	1.69^{NS}
Total digestion nutrients (%)	70.07	69.99	70.02	66.65	1.55^{NS}
Starch value (%)	65.95	65.85	65.81	62.41	1.75^{NS}
Digestible crude protein (%)	9.09^{a}	7.89^{b}	7.75^{b}	6.71^{c}	0.28^{**}

±SE = Standard error, NS = Not significant *(P ≥ 0.05)*, * = *(P ≤ 0.05)*, ** = *(P ≤ 0.01)*.
® Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

It is clear that replacing 30 % of the concentrate by olive pulp lowered the digestible protein. This may be due to the nature of olive pulp crude protein beside it's content of some anti-nutritional factors (Tannins). These results are paralled to those reported by Youssef *et al.,* 2001. Sansoucy (1995) also observed that the values of TDN and DCP of rations containing olive cake were significantly lower *(P ≤ 0.05)* compared to the control diet. They attributed the poor digestibility of dry matter and crude protein to the high concentration of lignin content in olive pulp rations containing diet. Also, El - Sayed *et al.* (1996) found that the values of TDN and DCP for the diet contained 25 % of olive pulp were lower than that containing 15 % level of olive cake. Feggeros and Kalaisakes (1987) concluded that the reduction in digestibility and the nutritive value of diets with a high proportion of stoned olive pulp with sheep may be due to the relatively their higher contents of lignin, cutin and tannins than the normal control diet.

Productive performance:

Feed intake:

Results of the total feed intake (kg / head / day and kg DM /100 kg body weight / day) are presented in Table (4). The values of total DM intake (kg / head / day) or (kg DM /100 kg body weight / day) were insignificantly decreased as olive pulp proportion increased in the diet. While, the values of SV or DCP were insignificant (*P ≥ 0.05*) and significant decreased (*P ≤ 0.05*), respectively as olive pulp increased in the diet (Table 4). These results are in agreement with those reported by Giouzel *et al*. (1978) who reported no significant difference in term of DM intake for lambs fed 15 or 25 % olive cake.

Milk production and it's composition:

Milk production and it's composition are presented in Table (5). Actual and 7 % fat-corrected milk yields show that the differences between treatments in milk yields were insignificant. These results are in agreement with Salama *et al.,* (1993) and Kholif *et al.,* (2001) who reported that there were no marked effects observed on daily fat-corrected milk yield and actual milk yield in goats and sheep fed olive cake compared to the control animals. Also, the same results were recorded by Belibasakis (1982) on dairy cows fed diets containing 10 and 20 percent of olive cake from the concentrate feed mixture, he found no significant differences in milk production and it's composition.

Table (4): Feed intake by lactating buffaloes fed the experimental rations.

Items	Rations®				±SE
	R1	R2	R3	R4	
Average body weight (ABW kg)	557.5	567.0	570.5	580.0	11.41^{NS}
Total dry matter intake (kg / day)	18.09	17.94	17.64	17.45	0.2^{NS}
Total dry matter intake / 100 kg BW./ day	3.24	3.16	3.22	3.01	0.06^{NS}
Starch value (kg / day)	10.68	10.87	10.82	9.68	0.136^{NS}
Digestible crude protein (kg / day)	1.64^{a}	1.42^{b}	1.42^{b}	1.17^{b}	0.0184^{*}

SE = Standard error, NS = Not significant (*P ≥ 0.05*), and * = *P* < 0.05
® Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

The results of milk fat, protein, lactose, total solids, solids not fat and ash contents are presented in Table (5). The results of fat content indicated significant differences ($P \leq 0.05$) among treatments. The values were 6.3, 6.3, 6.6 and 6.1 % in buffaloes fed R1, R2, R3 and R4, respectively. In the present study the milk fat % in ration 4 decreased than the other diets. The difference approached significant when R4 was compared with R3. Moreover, the milk yield was also the lowest for R4 than the other treatments. These results may be explained in view of TDN, SV and nutrient digestibility results. The relationship between milk fat % and the feeding value of rations is positive (Vandeharr, 2005).

The results in (Table 5) indicated that there were insignificant differences among all dietary treatments for milk protein percentage. The slightly lower milk CP concentration for R3 may be due to the slightly lower value of DCP (7.35 %) in comparison with R1 or R2 (9.09 and 7.89 %), respectively, even though R4 showed lower value for DCP (6.71 %), while the CP in milk for R4 was greater than R3 (4.07 *vs*. 3.40 %). The greater percentage of CP in the milk of buffaloes fed R4 (4.07 %) than R2 and R3 (3.98 and 3.40 %) is hardly to be explained since the DCP % was greater for buffaloes fed R2 (7.89) and R3 (7.75) than those fed R4 (6.71). From another point of view, buffaloes fed R4 consumed greater amount of urea (0.13 kg / head / day) compared with (0.04 and 0.08 kg / head / day) for R2 and R3, respectively. Urea is excreted in milk as a way to get rid of the un-required amount of blood urea (NRC, 2001).

Table (5): Effect of experimental rations on actual and 7 % fat corrected daily milk yield (kg) and it's composition.

Items	Rations®				±SE
	R1	R2	R3	R4	
Actual daily milk yield (kg)	6.7	7.2	6.9	6.4	0.23^{NS}
7% FCM yield (kg)	6.2	6.6	6.6	5.8	0.25^{NS}
Milk fat content (%)	6.3^{b}	6.3^{b}	6.6^{a}	6.1^{b}	0.08*
Milk protein content (%)	4.11	3.98	3.40	4.07	0.07^{NS}
Milk lactose content (%)	5.12	4.98	4.78	4.98	0.20^{NS}
Milk total solids content (%)	16.29	16.04	15.60	15.98	0.14^{NS}
Milk solids not fat content (%)	9.99	9.74	9.00	9.88	0.17^{NS}
Milk ash content (%)	0.76^{b}	0.78^{ab}	0.82^{ab}	0.83^{a}	0.02^{*}

±SE = Standard error, NS = Not significant (*P ≥ 0.05*), * = *P* < 0.05.
® Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

The results of milk lactose (Table 5) indicated that there were insignificant differences among treatments. These results are in agreement with those of Kholif *et al.* (2001), who reported that when lactating goats and sheep fed ration containing olive cake showed no significant differences among all dietary treatments for milk lactose content.

Milk total solids percentage (TS), and solids not fat (SNF) percentage are shown in Table (5), the values were 16.29, 16.04, 15.60 and 15.98 % for total solids and 9.99, 9.74, 9.00 and 9.88 % for solids not fat for R1, R2, R3 and R4, respectively. The results herein are in agreement with the findings of Kholif *et al.* (2001), who reported insignificant differences for total solids and solids not fat percentages of lactating goats and sheep fed rations containing olive cake compared to the control animals.

The results of milk ash content (Table 5) show that there were significant differences (*P ≥ 0.05*) among all dietary treatments. These results are in agreement with those of Kholif *et al.* (2001) who found that when lactating goats and sheep fed on olive cake ration had significant differences among all dietary treatment for milk ash content.

Milk production efficiency:

The milk production efficiency (Table 6) was determined as the amount of 7 % FCM produced per one kg of dry matter (DM), starch value (SV) and digestible crude protein (DCP) intake. The results indicated that there were insignificant differences among treatments in FCM production efficiency for DMI and SVI, while a significant (*P ≤ 0.05*) effect for FCM production efficiency for DCPI was shown. These results are in agreement with Omer *et al.,* (1995), Abd El-Rahman *et al.* (2003), and Mostafa *et al.,* (2003), they found that economic efficiency was improved by using olive cake up to 20 - 30 % of CFM in sheep rations. Also, Khamis *et al.* (1989) reported that olive pulp was favorably and economically used in supplementing lactating ewes grazing the native pastures of southern Sinai as a replacer of feeding highly expensive hay and concentrates which transported from the Nile Valley.

Table (6): Milk production efficiency of buffaloes fed on different levels of olive pulp.

Items	Rations®				±SE
	R1	R2	R3	R4	
Daily intake (kg / head / day)					
Dry matter intake (DMI)	18.09	17.94	17.64	17.45	0.20^{NS}
Starch value intake (SVI)	10.68	10.87	10.82	9.68	0.13^{NS}
Digestible crude protein intake (DCPI)	$1. 64^{a}$	1.42^{b}	1.42^{b}	1.17^{b}	0.02^{*}
Milk production efficiency (kg)					
7% FCM / kg DMI	0.34	0.37	0.36	0.33	0.03^{NS}
7% FCM / kg SVI	0.58	0.61	0.61	0.60	0.05^{NS}
7% FCM / kg DCPI	3.78^{b}	4.65^{ab}	4.65^{ab}	4.96^{a}	0.34^{*}

±SE = Standard error, NS = Not significant (*P ≥ 0.05*), * = *P* < 0.05.
® Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

Economical feed efficiency:

Economical efficiency (price of the 7 % FCM produced / cost of the consumed feed) was illustrated in Table (7). Ration 3 (20 % olive pulp) showed the highest economical feed efficiency (1.68) followed by R4 (1.64) and R2 (1.52) compared to the control ration (1.32). The same trend was noticed for the improvement %, the values were 100, 115, 127 and 124 % for R1, R2, R3 and R4, respectively. These results are in agreement with Khamis *et al.* (1989), Fayed *et al.* (2001), Abd El- Rahman (2003) and Mostafa *et al.* (2003), they found that the feed cost per kg gain was relatively lower than the control when lambs were fed rations contained 15 - 35 % olive cake.

Table (7): Economical feed efficiency of buffaloes fed different levels of olive pulp.

Items	Rations®			
	R1	R2	R3	R4
Daily feed consumption (kg)				
Concentrate	9.28	8.03	6.65	5.31
Olive pulp	0.00	0.97	1.95	2.96
Urea	0.00	0.04	0.08	0.13
Berseem hay	5.58	5.68	5.71	5.8
Rice straw	5.00	5.00	5.00	5.00
The cost of the feed intake (LE)	15.23	14.07	12.73	11.47
Daily milk production FCM (kg)	6.20	6.60	6.60	5.80
The price of daily milk production (LE)	20.15	21.45	21.45	18.85
The cost of 1kg 7% FCM produced(LE)	2.46	2.13	1.93	1.98
The net return / animal / day (LE)	4.92	7.38	8.72	7.38
Profitability (%)	32.30	52.45	68.50	64.34
Economical efficiency	1.32	1.52	1.68	1.64
Improvement %	100	115	127	124

The price of concentrate mixture, olive pulp, berseem hay, rice straw, urea and milk = 1200, 250, 600, 150, 1000.0 and 3250 LE / ton, respectively.
Profitability (%) = The net return / The cost of the feed intake.

CONCLUSION

Based on the results of this study, it could be concluded that olive cake can successfully be used to substitute the concentrate feed mixture for lactating buffaloes up to 20 % on dry matter basis. Also, substituting of olive pulp cake up to 20 % for Egyptian lactating buffaloes tended to increase milk yield without any adverse effects on it's composition and economically gave better relative economic efficiency than the control ration.

REFERENCES

Abd El-Rahman, G .A., Abou-El-Nasr, H. M., Ayyat, M. S., Fayed, A. M. and Nassar, M. S. (2003): Utilization of some agro-industrial by-products in fattening lambs on the natural ranges in the south of valley. J. Nutrition and Feeds. 6 (Special Issue): 851- 865.

AOAC., (1990): Association of Official Analytical Chemists. Official methods of analysis. 13th ed. Washington , D. C., USA.

Belibasakis, N. G (1982): The olive cake in the feeding of lactating cows. Annual Scientific Report Veterinary school Thessaloniki. 21: 275 (In Greek, English summary).

Duncan's, D.B. (1955): Multiple range and multiple F-test Biometrics 1: 1-42.

El-Sayed, E. L; Shehata S. and Abou Amo, F. (1996): Evaluation of olive pulp cake in complete diets for sheep in western desert of Egypt. Menofia J. Agric. Res. 21 : 1215.

Fayed, A. M; Youssef, K. M. and Abou-El-Naser, H. M. (2001): Nutritional performance of goat fed non-conventional diets based on olive pulp in Sinai Egyptian J. Nutrition and Feeds. 1: 81- 89.

Feggeros, K. and Kalaisakes, P. (1987): Digestibility and nutritive value of stoned olive cake in sheep. Epitheorese-Zootehnik. Epistemos, 5: 15.

Francisco, T ; Rioperez, J. and Luisa Rodriguez, M. (1989): Nutritional value for rabbits of olive pulp and the effects of visceral organs. Animal Feed Sci. and technology, 25: 79.

Giouzel G., Tsiklidi, A. and Katanes, I. (1978): The olive cake meal in the feeding of fattening lambs. Agric. Research, 2: 223, (In Greek, English summary).

Khamis H. S, El-Shaer H. M, Farid M. F. A, Shalaby A. S. and Salem O. A. (1989): Utilization of date seeds and olive pulp as supplementary feed for lactating ewes in Sinai. Proceeding of the 3rd Egyptian British conference on Animal, Fish and poultry production. Alex , Egypt.

Kholif, A. M., ElAmary, H. and El-Shanti H. A. (2001): Effect of including date seeds and olive cake in diets on the yield and composition of goats and sheep milks in Southern Sinai. J. Agric. Sci. Mansoura University. (8): 4765-4772.

Ling, E. R. (1963): A Text Book of Dairy Chemistry. 11, 3rd Ed., London Chapman and Hall Ltd.

Mostafa M. R. M; Salam R; Lashin M. E and Abodu A. A. (2003): Utilization of olive cake in fattening rations of Rahmani lambs. J. Nutrition and Feeds 6 (Special Issue): 811 -820.

NRC. (2001): Nutrient Requirements of dairy cattle (7th revised edition). Washington, DC: National Academy Press.

Omar J. M. A; Gavoret, L. and Abo Omar, J. M. (1995): Utilization of olive cake in fattening rations of Awassi lambs. Review-de-Medicine-Veterinaire, 146 : 293.

Rafat, N. A. and Saleh; M. S., (1962): Two formulas for the conversion of cow's and buffaloe's milk of different fat percentage into milk of standard fat percentage, Proceeding First Conf. Anim. Prod. (Feb.) Conference at El-Minia: 203. (cited from El-Ashry, I. A., *et al*., 2003: Egyptian J. Nutr.& Feeds, 1: 25-36).

Sansoucy, R. (1995): Olive by-products for animal feed. Food and Agriculture Organization of the United Nations, Roma, P. 10.

Salama, H. A., Salama, R., El-Shaer, H. M. and Afifi, A. (1993): Utilization of date seeds and olive pulp as supplementary feed for grazing pregnant and lactating sheep and goats in Sinai. J. Agric. Sci, Mansoura Univ., 18: 1633-1644.

SAS, (1998): Statistical Analysis System User's Guide: Statistics SAS Institute, Inc., Cary, NC.

Vandeharr, M. J. (2005): In: Basic Animal Nutrition and Feeding. Pond, W. C., D. C., Church, K. R., pond and P. A., Schoknetht., Chapter 23, Dairy cattle, John Wiley and Sons. USA.

Youssef, K. M., Fayed, A. M. and Khamis, H. S., (2001): Productive and reproductive performance of ewes and does fed non-conventional diets based on olive pulp in Sinai. Egyptian J. Nutr. and Feeds, 4 (Special Issue) : 591.

تقييم مخلفات تفل الزيتون فى غذاء الجاموس المصرى الحلاب

سيداحمد محمد سيداحمد مصطفى[1] ، عبدالمنعم على سيد محجوب[2] ، محمد الطاهر سلام[1]، عادل عبدالله عبدالغنى[1] و طارق عبدالوهاب دراز[2]

1- قسم الإنتاج الحيوانى – كلية الزراعة – جامعة المنيا.

2- قسم الإنتاج الحيوانى – مركز البحوث الزراعية – الدقى – الجيزة.

أجريت هذه الدراسة بمحطة بحوث الإنتاج الحيواني بسدس - معهد بحوث الإنتاج الحيواني - مركز البحوث الزراعية بوزارة الزراعة بهدف دراسة تأثير إحلال تفل الزيتون بنسبة ١٠ ،٢٠ ،٣٠ % من العلف المركز فى علائق الجاموس الحلاب وتأثير ذلك على القيمة الغذائية بالإضافة إلى إنتاج اللبن ومكوناته. وكانت العلائق المستخدمة فى الدراسة هى:

العليقة الأولى (القياسية): علف مصنع (١,٥ % من وزن الجسم) ودريس البرسيم وقش الأرز كل منهما بمعدل ١ % من وزن الجسم على الترتيب.

العليقة الثانية: نفس العليقة الأولى مع إستبدال ١٠ % من العلف المصنع بمخلفات تفل الزيتون.

العليقة الثالثة: نفس العليقة الأولى مع إستبدال ٢٠ % من العلف المصنع بمخلفات تفل الزيتون.

العليقة الرابعة: نفس العليقة الأولى مع إستبدال ٣٠ % من العلف المصنع بمخلفات تفل الزيتون.

وعلى ذلك فقد تم إجراء تجربتين هما:

تجربة هضم: استخدم فيها عدد ١٢ كبشا أوسيمى ، قسمت إلى أربعة مجاميع بنظام القطاعات العشوائية الكاملة (عدد ثلاثة كباش فى كل مجموعة) ، غذيت كل مجموعه على أحد العلائق الغذائية المختبرة السابق ذكرها. مع ملاحظة أنه تم إضافة يوريا فى المعاملات رقم ٢، ٣, ٤ لتصبح العلائق الأربعة متساوية فى النيتروجين.

تجربة إنتاج اللبن على الجاموس: إستخدم فيها عدد ١٦ جاموسة حلابة متوسط وزنها ٥٦٨,٧٥ ± ١١,٢٥ كجم ، وتم توزيعهم بالتساوي على أربع مجاميع (عدد ٤ جاموس فى كل مجموعة) وتم تغذية كل مجموعة من الحيوانات على أحد العلائق الأربعة السابقة. ومن أهم النتائج المتحصل عليها مايلى:

إنخفاض غير معنوى فى معاملات الهضم لكل من المادة الجافة والمادة العضوية والدهن الخام والألياف الخام والمستخلص الخالى من الأزوت فى حين إنخفض معامل هضم البروتين الخام معنويا عند مستوى ٠,٠٥ % بزيادة محتوى العليقة من تفل الزيتون. لم تتأثر القيمة الغذائية معبرا عنها بالمركبات الغذائية المهضومة ومعادل النشا معنويا فى حين حدث انخفاض معنوي للبروتين المهضوم مع زيادة تفل الزيتون بالعليقة. كما حدث أنخفاض غير معنوى فى كل من المأكول من المادة الجافة (كجم / رأس/ يوم) ، المأكول من المادة الجافة (كجم / ١٠٠ كجم وزن حي / يوم) و معادل النشا (كجم / رأس/ يوم) ، بينما حدث انخفاض معنوي فى البروتين المهضوم (كجم / رأس/ يوم) مع زيادة محتوى العليقة من تفل الزيتون.

أظهرت نتائج تجربة إنتاج اللبن على الجاموس عدم وجود فروق معنوية بين المعاملات فى إنتاج اللبن المعدل ٧ % دهن ، وكانت أعلى القيم فى المعاملات الثانية ٦,٦ والثالثة ٦,٦ (كجم / اليوم) ، بينما المعاملة الرابعة أعطت أقل القيم (٥,٨ كجم) فى مقابل ٦,٢ كجم / اليوم للمجموعة القياسية. وقد أظهرت النتائج أن التغذية على تفل الزيتون ليس لها تأثير معنوي على مكونات اللبن من البروتين ، اللاكتوز ، والمواد الصلبة الكلية والمواد غير الصلبة ، بينما كانت هناك إختلافات معنوية فى النسبة المئوية للدهن والرماد فى اللبن بين المعاملات. بالنسبة للكفاءة الاقتصادية ، فقد أظهرت النتائج أن جميع المعاملات حدث فيها تحسن بالمقارنة بالكنترول ، وقد تفوقت العليقة رقم ٣ فى الكفاءة الإقتصادية وكذلك معدل التحسن بالنسبة للكنترول ، يليها المعاملات ٢ و ٤ على الترتيب. وعلى ذلك فإن العلائق المحتوية على تفل الزيتون تعتبر هي الأقل تكلفة مقارنة بالعليقة القياسية.

من النتائج المتحصل عليها من تلك الدراسة يتضح أنه يمكن إستبدال تفل الزيتون بنجاح بدلاً من العلف المركز (حتى ٢٠%) فى عليقة الجاموس الحلاب المصرى. حيث أن استبدال تفل الزيتون فى علائق الجاموس الحلاب حتى ٢٠% من العلف المركز يعمل على زيادة إنتاج اللبن بدون أي تأثيرات ضارة على إنتاج اللبن أو مكوناته ، كما أنها ترفع من الكفاءة الإقتصادية عن المعاملة القياسية.

1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841

1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841