PERFORMANCE OF GROWING SHEEP FED RATIONS CONTAINING LIME TREATED DATES SEED AND OLIVE PULP.

K. Z. Kewan[1]; M.A. Ali[2]; M. A. Hanafy[2] and Eman Sh. Ashmawy[1]

[1]*Department of Animal and Poultry Nutrition, Desert Research Center, Cairo, Egypt.*

[2]*Department of Animal Production, Faculty of agriculture, Cairo University, Egypt.*

(Received 25/4/2011, Accepted 24/8/2011)

SUMMARY

This investigation was carried out to study the effect of different lime treatments on chemical composition and *in situ* dry and organic matter disappearance of date seeds and olive pulp, then the effect of these treated materials on performance of sheep. Date seeds and olive pulp were treated by different levels (0, 4, 8 and 12%: w/w) of lime solution for different periods (1, 2, 3 and 4 weeks). Results indicated that there were linear improvements in chemical composition with increasing lime treatment level and period. Treated date seeds and olive pulp by 12% lime solution for 4 weeks decreased ADL content by 25 and 24%, respectively. Moreover, *in situ* DM and OM disappearance were increased from 34.55 to 68.54 and from 35.64 to 70.88%, respectively for date seed and from 35.62 to 42.83 and from 34.54 to 43.37% at the same order for olive pulp. Mixture from date seeds and olive pulp (1:1) treated by 12% lime solution for 4 weeks was used to replace 20 (T1) or 40% (T2) of concentrate feed mixture in Barki lambs rations (30% clover hay: 70 concentrate, control, C). Thirty growing male Barki lambs (5 months age and weighed 27.98 ± 1.97 kg) were assigned into equal three groups (10 lambs in each) to be fed randomly on the previous rations (C, T1 or T2) in a growth trial which lasted 100 days. Results indicated that animals fed T1 recorded similar nutrients digestibility and nutritive value (TDN and DCP%) when compared with animals fed the control ration. The dry matter intake and the average daily gain were decreased by 5 and 7%, respectively for T1 and by 13 and 26% for T2 compared with the control. Feed conversion (kg DMI / kg gain) was the best for control following by T1 then T2 being 7.86, 8.02 and 9.22 kg, respectively. The lowest feed cost per 1 kg gain was recorded for lambs fed T1 (10.82 L.E.) while the highest (12.04 L.E.) was recorded for these fed T2 compared to 11.76 L.E. for the control. So, it could be concluded that replacing 20% of concentrate feed mixture by a mixture (1:1) of dated seed and olive pulp treated with 12% lime solution for 4 weeks in growing lambs rations had a positive effect on the economic efficiency of feeding growing lambs.

Keywords: *date seeds, olive pulp, lime solution, In situ, sheep, growth performance.*

INTRODUCTION

The annual feed requirements for animal wealth are about 14 million tons of total digestible nutrients (TDN) and the shortage of animal feeds calculated to be 9 million tons of dry matter, equivalent to almost 3.1 million tons of TDN (Fayed *et al.*, 2009). According to this problem, a growing attention is being focused on the use of crop by-products, agriculture industrial by-products, fruits and vegetables wastes for ruminant feeding. Using of these resources will decrease the amounts of concentrate feed mixture offered to animals and subsequently reduce the feed cost as well as limiting the environmental pollution (Abou Slim and Bendary, 2005), Furthermore, it reduces the amount of some feedstuffs that are imported for animal feeding. Expanding the use of agro-industrial by-products and non-conventional feed resources represents possibly, the most challenging task concerning components of the animal industries in Egypt.

Large amounts of date seeds and olive pulp are available in Egypt which can be utilized as cheap non-conventional ingredients to be incorporated in ruminant rations. According to the latest government statistics, date fruits production in 2006 is about 1.121.890 tons. However, the quantity of olive pulp that is available for

utilization is estimated to be 204.722 tons (Ministry of Agriculture, 2004). These industrial by-products have low nutritive value and many treatments (physically, chemically and biologically) have been done to improve its nutritive value.

The main objectives of the present study were: a) establishment the optimum level of lime treatment (level × incubation period) to improve the nutritive value of date seeds and olive pulp and b) Investigate the impact of partial substitution of concentrate mixture by a mixture of lime treated date seeds and olive pulp on performance of growing lambs.

MATERIALS AND METHODS

The present study was carried out at Maryout Experimental Research Station, Desert Research Center, Egypt.

1. Lime Treatments

Unslaked lime was dissolved in water at different levels (0, 4, 8 and 12%; w/w) to study the effect of alkaline treatment on chemical composition of date seeds and olive pulp as agro-industrial by-products. The supernatant of lime solutions were sprayed manually on the raw materials (350 ml/1 kg DM) and mixed thoroughly by hand (final moisture concentration ranged from 35 to 40%) before keeping in polyethylene bags. The treated materials were sealed completely and kept for different periods (1, 2, 3 and 4 weeks). At the end of each period, samples were taken and dried at 80°C for 48 h for chemical composition determination.

2. In situ Evaluation

In situ dry matter disappearance *(ISDMD)* and organic matter disappearance (*ISOMD*) of date seeds and olive pulp were measured as described by Mehrez and Ørskov (1977). Two grams air dried sample from each treatment (milled through 2 mm screen) were placed in bags (6×12 cm) prepared from polyester cloth (41 µm pore size). Bags (two bags from each treatment) were suspended under the rumen of three ruminally fistulated Barki rams (fed clover hay at 2.5% of live weight) for 24h. to illustrate the best lime treatment conditions for date seeds and olive pulp to improve its digestion and utilization by ruminant.

3. Growth Trials

a. Animals and Management:

Thirty male Barki lambs (5 months age) with an average body weight 27.98± 1.97 kg were assigned into three similar groups according to body weight (10 lambs in each). Each group was housed separately in shaded pen (5 X 6 meter). The three groups were randomly assigned at random to receive one of the three experimental rations. The experiment started in September, 2007 and lasted for 100 days.

b. Experimental rations

Three experimental rations were formulated using date seeds and olive pulp treated with 12% lime for 4 weeks which showed the best *in situ* disappearance :

(C): 30% clover hay + 70% CFM (composed of 35% un-decorticated cotton seed cake, 33% wheat bran, 22% yellow corn grains, 4% rice bran, 3% molasses, 1% salt and 2% limestone).

(T1): 30% Clover hay + 50% CFM + 10% treated date seeds (TDS) + 10% treated olive pulp (TOP).

(T2): 30% Clover hay + 30% CFM+ 20% TDS + 20% TOP.

The quantities of rations offered to each group were adjusted biweekly during the experiment at about 4% of average body weight. During the growth trial, each group was fed once daily at 8:00 am, refusals (if any) were collected just before offering ration at the next day. The actual voluntary feed intake was recorded daily for each group. Fresh water was available to animals in free choice all day. Body weight changes and daily gain were recorded for each animal.

c. Digestibility and Nitrogen Balance Trials

At the end of the growth trial, 5 animals from each group were chosen randomly to determine the nutrients digestibility, nitrogen balance and feeding value of the experimental rations. The digestibility trials lasted for 17 days (first 10 days were a preliminary period, followed by a 7 days as collection period). Feces and urine were quantitatively collected daily from each animal, then ten percent of each fecal and urine samples was taken. Representative samples from feed, faces and urine were kept for analyses.

4. Analytical Methods

a. Chemical Analysis

Chemical composition (DM, OM, CP, CF, EE and NFE) of feeds and feces was determined according to the procedure of A.O.A.C (1990). Neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were analyzed using the procedure of Van Soest *et al.* (1991).

b. Statistical Analysis

Data obtained from the present study was statistically analyzed according to SAS (1998). The model used for *in-situ* trial was:

$$Y_{ij} = \mu + L_i + T_j + (L \times T)_{ij} + e_{ij}$$

Where: Y_{ij} = experimental observation, μ = general mean, L_j = effect of lime level, T_j = effect of treatment period, (L×T) = the interaction effect due to lime level and treatment period.

While the model used for growth trial was:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where: Y_{ij} = experimental observation, μ = general mean, T_i = effect of treatment, e_{ij} = experimental error

Differences in means among groups were compared by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

1. Effect of Lime Treatments on Chemical Composition:

a. Date Seeds

Changes in chemical composition of date seeds as a result of lime treatments are illustrated in Table (1). All lime levels for all incubation periods increased the percentage of ash content compared with the control. The increases in ash negatively affected OM contents which were reduced when date seeds were lime treated compared with the control. This result agreed with that reported by Chen *et al.* (2008) and Pina *et al.* (2009). The highest ash content and the lowest OM content were observed when date seeds were treated by 12% lime for 4 weeks, being 6.36 and 93.65%, respectively. Moreover, the contents of CP, EE, CF and ADL in treated date seeds were decreased with all lime treatments compared with the control, these values ranged from (6.85 to 6.89), (1.93 to 3.91), (12.31 to 16.39) and (11.43 to 13.19%), respectively compared to 6.91, 5.15, 19.11 and 15.22 for the control in the same order. These results are in agreement with those obtained by Sirohi and Rai (1995), Abdul-Aziz *et al.*, (2001) and Granzin and Dryden (2003). The reduction in EE content might be due to the alkali treatment which breaks down EE into fatty acids (Das and Kundu ,1994). However, the reduction in the content of CF and ADL might be due to that the alkali treatments reduces the strength of intermolecular hydrogen bonds which might be physically restrained from swelling (Granzin and Dryden ,2003).

All treatments showed an increase in contents of NFE and cellulose compared to control. This agreed with the result of Chaudhry (2000) while it contrasts with the results of Chen *et al.* (2008) and Hassan and Irhaif (2009). While, inequality effects on hemicellulose content among treatments was detected in this study.

Table (1) Effect of different lime treatments on chemical composition (%) of date seeds (as DM basis).

Item	C	Lime solution level, %											
		4				8				12			
		Treatment period (week)											
		1	2	3	4	1	2	3	4	1	2	3	4
DM	86.97	91.3	92.1	92.27	91.8	91.46	91.79	92.49	92.7	91.6	91.64	91.66	92.55
Ash	1.10	2.36	3.24	3.81	4.01	4.50	5.30	5.91	5.02	4.99	5.69	6.10	6.35
OM	98.9	97.64	96.76	96.19	95.99	95.50	94.70	94.09	93.98	95.01	94.31	93.90	93.65
CP	6.91	6.88	6.87	6.89	6.87	6.86	6.89	6.87	6.87	6.87	6.87	6.85	6.85
EE	5.15	2.26	2.35	2.34	2.95	3.91	3.34	3.03	1.56	2.19	1.93	2.77	2.07
CF	19.11	15.12	15.69	16.39	16.17	14.48	14.54	14.89	14.94	13.57	13.31	12.49	12.31
NFE	67.73	73.38	71.85	70.48	70.00	70.25	69.93	69.30	70.61	72.38	72.20	71.79	72.42
NDF	41.09	48.75	52.37	52.29	52.71	49.18	52.15	51.8	51.69	51.72	51.08	52.78	53.65
ADF	35.41	43.73	42.76	44.9	45.34	40.96	44.34	42.51	43.71	46.15	46.81	46.81	46.96
ADL	15.22	13.19	13.00	12.71	12.31	12.77	12.56	12.26	11.87	12.31	12.12	11.81	11.43
Hemi-cellulose	5.68	5.02	9.61	3.39	7.37	8.22	7.81	9.29	7.98	5.57	4.27	5.97	6.69
Cellulose	20.19	30.54	29.76	32.19	33.03	28.19	31.78	30.25	31.84	33.84	34.69	35.00	35.53

b. Olive Pulp.

The effect of lime treatments on the chemical composition of olive pulp is presented in Table (2). The alkali treatments detected less effect on olive pulp contents, especially in CF content, compared to date seeds. This might be due to the physical properties and/or the high fat content of olive pulp which cause saponification and reduced the effect of alkali treatments. However, the ash, OM, CP, EE, CF, ADL, NFE, hemicellulose and cellulose contents had the same trend as in date seeds.

2. Effect of Lime Treatments on In Situ DM and OM Disappearance

In situ DM and OM disappearance of treated date seeds and olive pulp are shown in Table (3). Data concerning the effect of lime level showed that all lime levels significantly ($P<0.05$) increased *ISDMD* and *ISOMD* for treated date seeds compared with control and the highest values (67.36 and 68.64%, respectively) were for 12% lime treatment. However, 4% lime treatment level of olive pulp didn't significantly ($P<0.05$) affect *ISDMD* and *ISOMD* compared with control while, 8 and 12% lime level significantly ($P<0.05$) increased them and the best values were recorded with 12% lime level being 40.85 and 41.36%.

The effect of incubation period showed that all incubation periods for both date seeds and olive pulp significantly ($P<0.05$) increased *ISDMD* and *ISOMD* except after one week for olive pulp.

The interaction between lime levels and incubation periods showed a significant ($P<0.05$) increase in *ISDMD* and *ISOMD* with 12% lime solution for 4 weeks by 98.38 and 98.88% for date seed and by 20.24 and 25.57% for olive pulp compared with untreated date seeds or olive pulp. The better improvement which detected in date seeds than olive pulp might be attributed to 1) the higher ADL content in olive pulp than date seeds (Kewan ,1996) or 2) the higher fat content in olive pulp which covered the nutrients thus reduces the microbial digestion (Yáñez Ruiz, 2004a and b and Dehghan-Banadaky *et al.*, 2008).In this connection, Jung *et al.*, (1993) reported that the alkali treatments lead to changes in cell wall constituents and increased its degradation by rumen microflora. The present results are in agreement with those reported by Sirohi and Rai (1995), Jagruti *et al.* (1997),Chaudhry (2000) and Pina *et al.* (2009), but the disagree with those reported by Nagwani (1992) who didn't observe any improvement in digestibility when treated different roughages by 10 % (w/w) calcium hydroxide.

3. Effect of Incorporating Lime Treated Date Seed and Olive Pulp in Growing Lambs Rations on Nutrients Digestibility, Nutritive Value and Nitrogen Balance.

Date seed and olive pulp treated with 12% lime for 4 weeks were incorporated as a mixture (1:1) in growing lambs rations to replace 20 and 40% of CFM. The chemical composition of feed ingredients and experimental rations are presented in Table (4). The CP content in concentrate feed mixture (CFM) was higher than that in treated date seeds (TDS) and treated olive pulp (TOP). The values were 14.08, 6.85 and 8.50 for CFM, TOP, TDS, respectively. On the other hand, crude fiber content of TOP was higher than that of CFM and TDS being 28.31, 12.91 and 12.31, respectively. Nitrogen free extract content was the highest in TDS (72.42%). As in Table (4), the TOP showed the highest values of ADF and ADL contents (47.76% and 20.23%, respectively). The chemical composition of rations formulated with TDS and TOP (20 or 40%) was similar to the control ration (C).

Data in Table (5) showed no significant differences ($P\leq0.05$) in the digestibility of DM, OM, CP, NFE, NDF, ADF and ADL between animals fed T1 and those fed the control ration, while the differences were significant in CF digestibility, being 67.39% for control and 64.21% for T1.There were significant ($P<0.05$) decreases in all nutrients digestibility, except EE, for animal fed T2 compared with control. This decrease might be due to the higher contents of ash in T2 as indicated by Farghaly *et al.*, 2003 who found a decrease in nutrients digestibility when sheep were fed ration containing lime treated rice straw compared with those fed control ration. Moreover, Tamang *et al.*, 1992 illustrated that the digestibility decreased because of the high level of ash and lignin. While, there was no significant ($P<0.05$) difference in EE digestibility among groups or in all nutrients digestibility between T1 and T2.

The nutritive values as TDN and DCP and nitrogen balance had the same trend of nutrients digestibility, being 74.97 and 10.17% for the control, 70.84 and 8.88% for T1 and 68.08 and 8.43% for T2. The same trend was observed for nitrogen balance being 7.15, 6.87 and 5.40 g/day, respectively for control, T1 and T2.

Table (2) Effect of different lime treatments on chemical composition (%) of olive pulp (as DM basis).

Item	C	Lime solution level, %											
		4				8				12			
		Treatment period (week)											
		1	2	3	4	1	2	3	4	1	2	3	4
DM	86.31	92.47	92.64	92.68	92.63	92.64	92.25	92.74	92.63	92.71	92.71	92.89	92.75
Ash	4.00	5.30	5.53	5.61	5.78	6.60	6.81	7.00	7.29	7.69	7.82	7.99	8.01
OM	96.0	94.70	94.47	94.39	94.22	93.40	93.19	93.00	92.71	92.31	92.18	92.01	91.99
CP	8.52	8.33	8.38	8.41	8.24	8.48	8.28	8.44	8.17	8.23	8.37	8.40	8.50
EE	10.68	3.03	2.37	2.57	2.39	3.22	3.36	2.55	2.19	3.45	2.07	2.07	2.02
CF	30.08	28.15	28.37	29.04	27.77	28.29	28.78	29.70	29.72	26.55	27.95	27.87	28.31
NFE	46.72	55.19	55.35	54.37	55.82	53.41	52.77	52.31	52.63	54.08	53.79	53.67	53.16
NDF	46.62	59.02	55.24	59.05	60.56	57.48	56.22	57.61	57.56	57.57	56.79	54.39	61.38
ADF	40.88	45.69	44.42	47.38	45.79	45.36	45.23	44.45	44.39	46.28	46.47	46.28	47.76
ADL	26.64	22.80	22.10	21.8	21.10	22.36	21.67	21.38	20.69	21.99	21.33	20.91	20.23
Hemi-cellulose	5.74	13.33	10.82	11.67	14.77	12.12	10.99	13.16	13.17	11.29	13.32	11.11	13.63
Cellulose	14.24	22.89	22.32	25.58	24.69	23.00	23.56	23.07	23.70	24.29	25.14	25.37	27.53

Table (3): Effect of different lime treatments on *in situ* DM and OM disappearance of date seeds and olive pulp.

Item		*In_situ* disappearance, %			
		DM		OM	
Lime level %		Date seeds	Olive pulp	Date seeds	Olive pulp
0		34.55^{c}	35.62^{c}	35.64^{c}	34.54^{c}
4		60.35^{b}	34.47^{c}	61.06^{b}	35.19^{c}
8		66.15^{a}	36.58^{b}	67.27^{a}	37.48^{b}
12		67.36^{a}	40.85^{a}	68.64^{a}	41.36^{a}
±SE		0.86	0.63	0.86	0.84
Incubation period, week					
0		34.55^{c}	35.62^{b}	35.64^{c}	34.54^{b}
1		62.56^{b}	34.75^{b}	63.69^{b}	35.80^{b}
2		63.69^{b}	38.05^{a}	64.83^{b}	38.91^{a}
3		65.13^{ab}	37.68^{a}	65.90^{ab}	37.83^{a}
4		67.11^{a}	38.73^{a}	68.23^{a}	39.51^{a}
±SE		1.21	1.00	1.22	1.15
Interaction between lime level and incubation period					
Lime level (%)	Incubation period (week)				
0	0	34.55^{f}	35.62^{f}	35.64^{h}	34.54^{f}
4	1	57.60^{e}	31.86^{g}	58.48^{g}	32.95^{g}
	2	56.65^{e}	35.22^{f}	57.82^{g}	36.53^{de}
	3	62.73^{d}	35.67^{ef}	63.59^{f}	36.10^{de}
	4	64.42^{c}	35.13^{f}	64.35^{f}	35.17^{ef}
8	1	65.53^{bc}	34.37^{a}	66.73^{de}	35.70^{ef}
	2	66.33^{b}	36.10^{ef}	67.80^{cd}	36.83^{de}
	3	64.37^{c}	37.12^{de}	65.12^{f}	37.20^{d}
	4	68.38^{a}	38.73^{c}	69.45^{ab}	40.21^{b}
12	1	64.54^{c}	38.03^{cd}	65.87^{ef}	38.74^{c}
	2	68.08^{a}	40.24^{b}	68.86^{bc}	40.20^{b}
	3	68.30^{a}	42.33^{a}	68.98^{bc}	43.16^{a}
	4	68.54^{a}	42.83^{a}	70.88^{a}	43.37^{a}
±SE		0.80	0.74	0.79	0.72

a,b,c values in the same column for each category with different superscripts are significantly different.

Table (4): Chemical composition (%) of feed ingredients and experimental rations.

Item	Feed ingredients				Experimental rations		
	Hay	CFM[1]	Treated date seeds[2] (TDS)	Treated olive pulp[3] (TOP)	C[4]	T1[5]	T2[6]
DM	86.57	91.47	92.55	92.75	89.94	90.10	90.26
OM	90.41	97.84	93.65	91.99	95.61	94.91	94.21
Ash	9.59	2.16	6.35	8.01	4.39	5.09	5.79
CP	13.21	14.08	6.85	8.50	13.82	12.92	12.03
CF	24.42	12.91	12.31	28.31	16.36	17.40	18.44
EE	2.31	5.54	2.07	1.02	4.57	4.01	3.45
NFE	50.47	65.31	72.42	54.16	60.86	60.58	60.29
Cell wall constituents %							
NDF	74.67	52.91	53.65	61.38	59.44	60.08	60.73
ADF	47.18	21.40	41.96	47.76	29.13	32.42	35.70
ADL	7.80	9.76	11.43	20.23	9.17	10.02	10.87

[1] concentrate feed mixture consists of 35% un-decorticated cotton seed cake, 33% wheat bran, 22% yellow corn grains, 4% rice bran, 3% molasses, 1% salt and 2% limestone.

[2] Date seed treated by 12% lime for 4 weeks.

[3] olive pulp treated by 12% lime for 4 weeks.

[4] control ration: 30% clover hay + 70% CFM.

[5] 30% clover hay + 50% CFM + 10% TDS + 10% TOP.

[6] 30% clover hay + 30% CFM+ 20% TDS + 20% TOP.

Table (5): Digestibility, nutritive value and nitrogen retention of experimental rations fed to growing Barki lambs.

Item	Experimental rations			±SE	Sig.
	C	T1	T2		
Apparent digestibility (%):					
DM	71.03^{a}	68.71^{ab}	64.87^{b}	0.34	*
OM	73.91^{a}	71.74^{ab}	67.75^{b}	1.02	**
CP	73.57^{a}	70.08^{ab}	68.73^{b}	70.83	**
CF	68.39^{a}	64.21^{b}	63.43^{b}	0.86	**
EE	75.25	75.54	75.41	0.61	NS
NFE	76.49^{a}	72.88^{ab}	68.27^{b}	1.34	**
NDF	75.38^{a}	73.89^{ab}	70.72^{b}	0.84	*
ADF	64.24^{a}	65.79^{a}	56.34^{b}	1.58	*
ADL	29.06^{a}	28.94^{a}	21.59^{b}	3.56	**
Nutritive value (%):					
TDN	74.97^{a}	70.84^{ab}	68.08^{b}	1.10	**
DCP	10.17^{a}	8.88^{b}	8.43^{b}	0.26	**
Nitrogen balance, (g/day) (Calculated)					
Nitrogen intake	39.31	33.95	32.41	-	-
Fecal nitrogen	10.36	10.19	10.15	-	-
Urinary nitrogen	21.80	16.98	16.86	-	-
Nitrogen balance	7.15^{a}	6.87^{ab}	5.4^{b}	-	-

a,b,c values in the same row with different superscripts are significantly different.

***P≤0.01; *P≤0.05; NS not significant.*

4. Effect of Incorporating Lime Treated Date Seed and Olive Pulp in Growing Lambs Rations on Growth Performance and Economic Evaluation.

Data in Table (6) indicated that there was a liner decrease in the average daily gain with increasing the percentage of concentrate mixture substitution by the mixture of treated date seed and olive pulp. This decrease might be due to the reduction in dry matter intake with increasing the substitution level. The average daily gain was significantly (P<0.05) decreased by 6.8 and 26% with T1 and T2, respectively compared with control. This result is in agreement with the findings of Mioč *et al.* (2007). Dry matter intake had the same trend of average daily gain, being the highest in control (1384 g/h./d.) and the lowest was in T2 (1199 g/h./d.).

The best feed conversion (Kg DMI/ Kg gain) was recorded for control followed by T1 then T2, being 7.86, 8.02 and 9.22 Kg/ Kg gain, respectively.

The lowest feed cost per 1 Kg gain was recorded with T1 followed by control then T2, being 10.82, 11.76 and 12.04 L.E./ Kg gain, respectively.

Finally, it could be concluded that, 20% of concentrated feed mixture can be replaced by the same amount of a mixture of lime treated date seed and olive pulp (1:1) in rations for lambs with a positive effect on the economic efficiency of animals feeding.

Table (6): Effect of experimental rations on growing Barki lambs performance.

Item	Experimental rations			±SE	Sig.
	C	T1	T2		
A)Boody weight					
Initial weight, kg	27.60	29.00	27.33	1.45	NS
Final weight, kg	45.20	45.40	40.33	1.78	**
Total gain, kg	17.60	16.40	13.00	0.70	**
Average daily gain, g/d	176	164	130	7.01	**
B)Dry matter intake, g/h./d.					
Clover hay	415	422	382		
Concentrate feed mixture	969	714	590		
Treated by-products*	----	179	227		
Total	1384	1315	1199		
C)Feed conversion:					
kg DM /kg gain	7.86	8.02	9.22	-	-
D)Economic evaluation					
Total feed cost, L.E.	2.069	1.774	1.565	-	-
Feed cost/Kg gain, L.E.	11.67	10.82	12.04	-	-

**Mixture of alkali treated date seeds and olive pulp (1:1) and replaced CFM by 20% in T1 and 40% in T2.*

a,b,c values in the same raw with different superscripts are significantly different.

***P≤0.01; *P≤0.05; NS not significant.*

**** Price of CFM, hay and treated by-products mixture were 1640, 1150 and 680 L.E./ ton, respectively.*

REFERENCES

Abdul-Aziz, G.M.; Y.I. El-Talty and M.A. Ali (2001). Calcium hydroxide treatment of some organic wastes, 1. Effect on chemical composition and in vitro digestibility. Proceedings of the 8th scientific Conference on Animal Nutrition. Egyptian J. of Nut. and Feeds.,4 (Special issue), 415.

Abou Slim, I.A. and M.M. Bendary (2005). Feedstuff resources in Egypt, Sources and maximization of its utilization. Animal Production Research Institute, Second Conference & Regional Symposium on Buffalo Production, 27-29 September, 2005, Sakha, Kafr El-Sheikh, Egypt.

AOAC (1990). Association of Official Analytical Chemists. Official Methods of Analysis, 15th ed. Washington, D. C., USA.

Chaudhry. A.S. (2000). Rumen degradation *in sacco* in sheep of wheat straw treated with calcium oxide, sodium hydroxide and sodium hydroxide plus hydrogen peroxide. Anim.Feed Sci. and Technol., 83: 313.

Chen, X.L.; J.K. Wang; Y.N. Wu andJ.X. Liu (2008). Effects of chemical treatments of rice straw on rumen

fermentation characteristics, fibrolytic enzyme activities and populations of liquid- and solid-associated ruminal microbes *in vitro*. Anim. Feed Sci. and Technol., 141: 1.

Das, M.M. and S.S. Kundu (1994). The effects of calcium hydroxide, urea and calcium hypochlorite treatments on composition and degradability of wheat straw. Indian J. Dairy Sci., 47:59.

Dehghan-Banadaky, M.; H. Amanlob; A. Nikkhah; M. Danesh-Mesgaran and M.R. Emamic (2008). Rumen and post-abomasal disappearance in lactating cows of amino acids and other components of barley grain treated with sodium hydroxide, formaldehyde or urea. Anim. Feed Sci. Technol.142: 306.

Duncan, D.B. (1955). Multiple range and multiple F-test Biometrics, 11: 1.

Farghaly,M.S.; I.M. Awadalla and M.A. Ali (2003). Effect of urea and lime treatments on feeding value of wheat straw used in growing lambs ration. J. Agric. Sci. Mansoura Univ., 28 (9): 6645.

Fayed, Afaf M.; M.A. El-Ashry and Hind A. Aziz (2009). Effect of feeding olive tree pruning by-products on sheep performance in Sinai. World J. Agric. Sci., 5 (4): 436-445.

Granzin, B.C. and G.McL. Dryden (2003). Effects of alkalis, oxidants and urea on the nutritive value of Rhodes grass *(Chloris gayana cv. Callide)*. Anim. Feed Sci. and Technol., 103, 113.

Hassan, A.A. and S.H. Irhaif (2009). Physical and some chemical treatments and date palm syrup (DIPS) supplement effect on chemical composition and in vitro digestibility for barley straw. Proceeding of the 12th Scientific Conference of Animal Nutrition. 20-23 October, 2009. Egyptian J. of Nutrition and Feeds. 12:, (Special issue): 535,

Jagruti, G.; Mark, T.H.; Ferrer, A.; Byers, F.M.; Tuner, N.D.; Nagwani, M. and Chang, S. 1997. Lime treatment of agricultural residues to improve rumen digestibility. Anim. Feed Sci. and Technol. ,68 : 195 .

Jung, H.G., Buxton, D.R., Hatfield, R.D. and Ralph, J., 1993. Forages cell wall structure and digestibility. Am. Soc. Agron., Wisconsin, USA.

Kewan, K.Z. 1996. Some rationary factors affecting rumen activity and microbial protein synthesis. M.Sc. Thesis, Fac. Agric. Menoufiya Univ. Egypt.

Mehrez A.Z. and Ørskov E.R. 1977. A study of the artificial fiber bag technique for determining the digestibility of feed in the rumen. J. Agric. Sci. (Camb). 88: 645.

Ministry of Agriculture and Land Reclamation, 2004. Economics Affairs Sector, Vol. 2, p. 270,304, 328.

Mioč, B.; Pavić, V.; Vnučec, I.; Prpić, Z.; Kostelić, A. and Sušić, V. 2007. Effect of olive cake on daily gain, carcass characteristics and chemical composition of lamb meat. Czech J. Anim. Sci., 52, (2): 31.

Nagwani, M. 1992. Calcium hydroxide pretreatment of biomass. M.Sc. Thesis. Texas, A&M Univ.,College Station,TX

Pina, D.S.; Tedeschi, L.O.; Valadares Filho, S.C.; Azevedob, J.A.G.; Detmann, E. and Anderson, R. 2009. Influence of calcium oxide level and time of exposure to sugarcane on *in vitro* and *in situ* digestive kinetics. Anim. Feed Sci. Technol., 153 : 101.

SAS, 1998. Users guide statistics. Version 6, 4th ed., vol. 2, SAS Institute, Inc., Cary. NC. USA.

Sirohi, S.K. and Rai, S.N. 1995. Effect of different levels of lime, moisture content and reaction period on chemical composition and *in vitro* digestibility of paddy straw. Indian J. of Anim. Sci., 65, 7:775.

Tamang,Y.; Samarta, G.; Charkraborty,N. and Mandel,L. 1992. Nutritive value of Azolla and its potentiality of feeding in goats. Environ. Ecol., 10:445.

Van Soest, P.J.; Robertson, J.B. and Lewis, B.A. 1991. Methods for rationary fiber, neutral detergent fibre and nonstarch polysaccharides in relation to animal nutrition. J. Dairy Sci., 74: 3583.

Yáñez Ruiz, D.R.; Martin Garcia, A. I.; Moumen, A. and Molina Alcaide, E. 2004a. Ruminal fermentation and degradation patterns, protozoa population and urinary purine derivatives excretion in goats and wethers fed rations based on olive leaves. J. Anim. Sci., 82:3006.

Yáñez Ruiz, D.R.; Moumen, A.; Martín García, A.I. and Molina Alcaide, E. 2004b. Ruminal fermentation and degradation patterns, protozoa population, and urinary purine derivatives excretion in goats and wethers fed rations based on two-stage olive cake: Effect of Polly ethylene glycol supply. J. Anim. Sci., 82:2023.

أداء الأغنام النامبه المغذاة علائق محتويه على نوى البلح ولب الزيتون المعاملين بالجير

خالد زين العابدين كيوان[1] و على محمد على[2] و محمد أحمد حنفى[2] و إيمان شعبان عشماوى[1]

[1] قسم تغذية الحيوان والدواجن، مركز بحوث الصحراء، القاهرة، مصر

[2] قسم الإنتاج الحيوانى، كلية الزراعة، جامعة القاهرة، مصر

تم إجراء هذا البحث لدراسة تأثير معاملة نوى البلح ولب الزيتون بمعاملات مختلفه بالجير على التركيب الكيماني واختفاء المادة الجافة والعضوية بالكرش ثم دراسة تأثير تغذية هذه المواد المعاملة على كفاءة الأغنام النامبه. حيث تم معاملة نوة البلح ولب الزيتون بتركيزات مختلفة (صفر، 4، 8، 12 %،و/و) من محلول الجير و التحضين لمدة 1، 2، 3، 4 أسابيع. وأشارت النتائج إلى وجود زيادة خطية للتحسن في التركيب الكيماني مع زيادة تركيز محلول الجير ومدة التحضين. معاملة نوى البلح ولب الزيتون بمحلول الجير 12% والتحضين لمدة 4 أسابيع أدى إلى انخفاض المحتوى من اللجنين غير الذائب في الحامض بنسبة 25 و 24% على التوالي. وكانت هناك زيادة في اختفاء المادة الجافة والمادة العضوية من 34.55 إلى 68.54% ومن 35.64 إلى 70.88% على التوالي لنوى لبلح المعامل ومن 35.62 إلى 42.83% ومن 35.54 إلى 43.37% بنفس الترتيب للب الزيتون. و تم استخدام مخلوط من نوى البلح ولب الزيتون المعاملين بمحلول الجير 12% والتحضين لمدة 4 أسابيع ليحل محل 20% (ت1) أو 40% (ت2) من مخلوط العلف المركز في علائق حملان البرقي النامية (30% خشن : 70% مركز، كنترول). ثلاثون حملا برقى (عمر 5 شهور بمتوسط وزن 28.98 ± 1.97 كجم) وزعت إلى 3 مجاميع متماثلة (10 حيوانات بكل مجموعة) لتغذى عشوائيا على العلائق السابقة (الكنترول، ت1،ت2) في تجربة نمو لمدة 100 يوم.

ولقد أشارت النتائج إلى أن معاملات هضم العناصر الغذائية والقيمة الغذائية في صورة مركبات غذائية مهضومة كلية وبروتين خام مهضوم للحملان المغذاة على ت1 كانت متشابهه مع تلك المغذاة على عليقه الكنترول. كان هناك انخفاض في المادة الجافة المأكولة ومعدل الزيادة اليومية في الوزن بنسبة 5 و 7% على التوالي للحملان المغذاة على ت1 و بنسبة 13 و 26% بنفس الترتيب السابق بالنسبة للحملان المغذاة على ت2 مقارنة بالكنترول. و كان أفضل معدل لكفاءة التحويل الغذائي (كجم مادة جافة مأكولة / كجم زيادة في الوزن) تم ملاحظته مع الحملان المغذاة على عليقه الكنترول ثم ت1 ثم ت2 وكانت على التوالي 7.86، 8.02، 9.22 كجم. ،اقل تكلفة 1 كجم زيادة في الوزن سجلت لحملان ت1 (10.82 ج.م) في حين سجلت حملان ت2 أعلى تكلفة (12.04 ج.م) مقارنة بتلك المغذاة على الكنترول (11.76 ج.م).

وعلى هذا يمكن استنتاج أن أحلال 20% من العلف المركز بخليط (1:1) من نوى البلح ولب الزيتون المعاملين بمحلول الجير 12% لمدة 4 أسابيع في علائق الحملان النامية كان له تأثير ايجابي على الكفاءة الاقتصادية في تغذية الحيوان.