Egyptian Journal of Sheep & Goat Sciences, Vol. 9 (1), April, P: 67- 76, April 2014

GROWTH PERFORMANCE, SOME RUMEN AND BLOOD PARAMETERS OF GROWING RAHMANI LAMBS FED RATIONS CONTAINING TRITICALE OR BERSEEM SILAGES AND THEIR MIXTURE.

G. I. El-Emam[1], Y.H. Hafez[2], H.R. Behery[2], E.I. Khalifa[2], E. I. Shehata[2] and M. E. Ahmed[2].
[1] By – products Utilization Research Department, Animal Production Research Institute (APRI), Agricultural Research Center (ARC), Dokki Giza, Egypt.
[2] Sheep and Goats Research Department, APRI, ARC, Dokki, Giza, Egypt.
Correspondence author: gabal1960@yahoo.com

ABSTRACT

Aiming to evaluate triticale silage compared with berseem silage and there mixture, a growth trial was carried out on 21 Rahmani lambs, divided to three similar groups, 7 each. All animals were fed concentrate feed mixture (CFM) to cover 50% of their requirement recommended by NRC (1985) for sheep, along with *ad libitum* offered silage. Berseem silage offered to G_1, silage mixture of 50% berseem plus 50% triticale was given to G_2 and sole triticale forage silage to G_3.The feeding trial lasted 112 days using randomized complete block design. In addition, three lambs of each group were involved in digestion trial to estimate digestibility and feeding values of the experimental rations.

Results show that CF, EE, NFE and NDF contents were higher, while CP, ash, ADF and ADL were lower in triticale silage than berseem silage. The chemical composition respecting all nutrient contents of silage mixture (berseem/ triticale) intermediated values of either berseem or triticale silages. Ruminal pH values were not significantly affected by treatments, while ammonia-N and microbial protein tended to be markedly higher with both berseem and berseem/triticale silages compared with triticale silage rations. But, ruminal TVF's concentration post-feeding showed the lowest values ($P<0.05$) with berseem silage ration compared with triticale silage one. Molar proportion of ruminal VFA's showed higher ($P<0.05$) acetate and propionate and lower ($P<0.05$) butyrate with the mixture silage ration (G_2) than the other rations. Blood serum urea concentration was significantly higher with berseem silage ration (G_1), while glucose concentration was significantly higher with triticale silage ration (G_3), compared to others. The digestion coefficients of most nutrients (CF, CP and EE) were significantly higher with G_2 than those of G_1 and G_3 rations. The TDN of G_2 ration was the highest ($P<0.05$) among the dietary treatments. The DCP values were more or less equal regarding G_1 and G_2 where both had higher DCP values than that of G_3 ($P<0.05$).

The daily DMI and TDN showed more values with mixed silage than sole silages, while DCP was least with triticale silage. Daily body gain was significantly more with mixed silage (145.9 g/h, G2) than both sole silages (133.4 g/h, G1 & 130.1 g/h, G3)

Feed conversion efficiency, based on DM, TDN and DCP, were better with G_2 (8.77, 5.72 and 0.93, respectively) in comparison with G_1 and G3 rations.

Keywords: *lambs – triticale silage – legume silage, mixture, grass/legume -growth performance.*

INTRODUCTION

Shortage of feed supply is the main constraint for further increase in animal population in Egypt. Furthermore, animals suffer from malnutrition particularly during summer season, where green forages with reasonable protein content are not adequate.

Attempts were carried out to introduce new green forages or silages such as *Sesbania sesban* (Soliman *et al*., 1997 and El-Kholany, 2004), *Kochia indica* (Shehata *et al*., 2001) either alone or as mixtures. Moreover, high yielding and high quality legume – grass mixtures play an important role in forage – animal production system (Gabra, 1984, Mooso and Wedin, 1990 and Ibrahim *et al*., 2008).

Moreover, using triticale silage and its mixture in ruminant rations had positive effects on digestion coefficients, feeding values and productive performance as well as some metabolic parameters (McCartney and Vaage, 1994 and Ahmed *et al*., 2013). Similarly, other studies were carried out to utilize some legumes and grass mixtures in farm animals feeding such as berseem with sorghum (El-Kholany, 1998), *Kochia indica* with teosinte (Ahmed *et al*., 2001) and *Sesbania sesban* with Millet x Napier grass hybrid (Ibrahim *et al*., 2012).

Therefore, the main objective of the present study was to investigate the effect of feeding triticale silage, berseem silage or their mixtures on digestion coefficients, feeding values and growth performance of Rahmani lambs. Some metabolic parameters of rumen and blood were also studied.

MATERIALS AND METHODS

The present study was conducted at El-Serw Experimental Research Station, Animal Production Research Institute, Ministry of Agriculture, Egypt.

Animals and feeding management:

Twenty one growing male Rahmani lambs were chosen from El-Serw Station herd, with an average age of 5 months and 20.0 kg live body weight (LBW). The animals were divided into 3 equal groups (7 each).

The animals were weighed at the beginning of the experiment and then biweekly. Lambs were fed for 3 weeks as a transitional period on the experimental rations before the start of the feeding trial that lasted 16 weeks. At the end of feeding trails, a digestibility trial (3 animals of each group) was conducted using acid insoluble ash (AIA) method according to Van Keulen and Yang (1977) to evaluate the digestibility and nutritive values of experimental rations.

Lambs in all treatments were fed restricted amount of CFM in order to cover 50% of NRC (1985) allowances for sheep. The experimental groups offered in addition to CFM portion, dietary treatments included berseem silage (G_1), mixture of 50% berseem – 50% triticale silage (G_2) and triticale silage (G_3), which offered *ad lib*.

Berseem and triticale were cultivated in El-Serw Experimental Station. These silages were made after chopping where moisture content at ensilaging time averaged 70%. Berseem silage was prepared by adding 3% molasses, on fresh weight basis according to Ahmed et al. (2013). The chemical analysis of CFM and different types of silages are presented in Table 1.

Water was available at all times. The rations were offered twice daily at 8 am and 3 pm. Samples of feeds and feces were analyzed according to A.O.A.C (1995).

Fermentative characteristics of the silage:

The ensiling period lasted approximately 60 days then periodical samples taken monthly along the feeding experimental period. Silage pH was directly determined using Orian 680 digital pH meter, while concentration of lactic acid, total and individual VFA's of the different types of silages were analyzed according to the method described by Everson et al. (1971). Determination of individual VFA's included acetic acid, butyric acid, propionic acid and iso butyric one.

Rumen fluid samples:

Rumen fluid samples were taken from 3 animals of each experimental group using stomach tube before feeding (0 time) and at 3 and 6 hrs post-feeding at the end of growth period. The samples were filtered through 3 layers of gauze and immediately subjected to the determination of pH value. Ammonia nitrogen (NH3-N) concentration was measured according to Conway (1957) and total volatile fatty acids (VFA's) was determined according to the technique described by Warner (1964).

Blood samples:

Blood samples were collected from the jugular vein once before feeding (3 animals in each group) at the end of growth period. Blood samples were centrifuged at 4000 rpm for 20 min. Part of the separated serum was directed to enzymes activity determination, while the other part was stored frozen at-20C° till the

other biochemical analyses. Commercial kits were used for all colorimetric biochemical determinations.

Statistical analysis:

Data were statistically analyzed by the least squares methods described by Likelihood program of SAS (2003). Differences among means were determined by Duncan's New Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition of rations' ingredients:

The chemical compositions of rations' ingredients are presented in Table 1. It could be observed that CP and ash contents were markedly higher with berseem silage than those of berseem/ triticale mixture silage or sole triticale one, while the contents of EE and NFE were seemed to be in an inverse trends among the silage types. Unmarked differences concerning CF and its fractions (NDF, ADF and ADL) were found among silage types. The chemical composition of CFM regarding most nutrients especially CP and CF were closely matched with the common manufactured CFM which produced locally for growing lambs and are agreeable with NRC, 1985. The chemical compositions obtained by this study were nearly similar to that obtained by ZoBell et al. (1992) and McCartney and Vaage (1994) for triticale silage and Haggag et al. (2002) and Ahmed et al. (2013) for triticale and / or berseem silages.

Fermentative characteristics of silage:

Results of silage quality (Table2) revealed that pH values were descended from the highest value (4.45) with berseem silage toward the lowest value (4.13) with triticale silage while the intermediate value was occurred with the mixture silage (4.31). It largely depends on the content of water-soluble carbohydrate in the biomass of plant and in this study triticale forage have much of it. The pH is an important criterion for the evaluation of silage quality. It reflects the changes that occurred during ensiling and is considered as the simplest test for the prediction of silage quality. Many investigators indicated that good quality silage should have Ph value between 3.8 and 4.5 (Ranjhan, 1980, Saddick et al., 1993 and Ahmes, 1998). Little differences among silage types regarding the percentage of lactic acid were found and all values appeared to be somewhat lower than those recorded in the literature. Ahmed et al. (2003), with corn silage, recorded higher value (5.31% of DM) than the present values of lactic acid. Also slight differences among silage types could be observed (Table 2) in respect of total VFA"s and individual acids. Such silage quality results are in harmony with those recorded by Ahmed et al. (2001), Shehata et al. (2001) and El-Kholany (2004).

Rumen liquor parameters

The effect of experimental rations on rumen pH values was not significant at all times tested, as shown in Table 3. Similar results were recorded by Haggag et al. (2002) with feeding triticale and berseem forages and their mixture. The higher pH values were found at 0 time, while the minimum value was observed 3 hrs post-feeding. The same trend was reported by El-Shinnawy et al. (2004) and Ibrahim et al. (2012). The obtained pH values, measured at all times, were within the normal ranges of normally functioning rumen (5.5 to 7.3) recorded by Hungate (1966).

Rumen NH3-N concentration (Table 3) tended to decrease toward the lowest values with sole triticale silage at all tested times. The differences were significant at 3 and 6 hours post feeding. Reduction in rumen NH3-N level was related to the lower content of crude protein in triticale compared with berseem. The same trend was observed by Ahmed et al. (2001) when used legume (Kochia silage) and grass (Teosinte silage) and their mixtures in small ruminant rations. Generally, ammonia-N levels were significantly increased to reach their peak at 3 hrs post-feeding for all rations. Ruminal NH3-N levels are within the normal range and close to the findings of Tawfik et al. (2005), Ahmed et al. (2011) and Sadek (2011).

Table 1: Chemical composition of silages made from berseem, triticale and their mixture and concentrate feed mixture, DM basis.

Items	Silages			
	100% berseem	50% berseem 50% triticale	100% triticale	CFM*
DM	30.85	30.01	31.13	90.5
CF	28.90	29.39	29.95	14.9
CP	13.95	12.67	11.29	15.00
EE	2.15	2.40	2.60	2.97
NFE	43.0	45.15	47.29	61.13
Ash	12.0	10.39	8.87	6.00
NDF	55.1	56.60	58.0	43.0
ADF	40.0	39.63	39.20	17.3
ADL	6.90	6.65	6.30	5.8

*CFM consists of 41% yellow corn, 26.5 % undecorticated cotton seed meal , 25% wheat barn, 3.5% molasses, 2.5% limestone, 1% common salt and 0.5% minerals mixture.

Table (2): Some quality criteria of different silages.

Item	100% berseem silage	50% berseem-50% triticale	100% triticale silage
pH value	4.45	4.31	4.13
Lactic acid, %	1.63	1.75	1.85
		VFA's fractions % :	
Acetic acid	0.91	0.95	1.03
Butyric acid	0.18	0.15	0.13
Propionic acid	0.31	0.27	0.24
Isobutyric acid	0.33	0.29	0.23
Total VFA's	1.73	1.66	1.63

Table 3: Effect of the experimental rations on rumen pH value, ammonia-N concentration and microbial protein content in Rahmani sheep.

Items	Hours	Groups		
		G_1	G_2	G_3
pH value	0	7.07±0.09	7.03±0.03	7.0±0.06
	3	6.58±0.04	6.49±0.04	6.55±0.06
	6	6.70±0.04	6.63±0.04	6.65±0.05
Ammonia- N (mg/100 ml)	0	17.60±0.50	17.07±0.58	16.80±0.5
	3	23.93±0.27^{a}	22.80±0.31^{ab}	21.97±0.52^{b}
	6	21.40±0.31^{a}	20.53±0.35^{ab}	19.93±0.44^{b}
Microbial protein (g/100ml)	0	0.320±0.01	0.327±0.01	0.313±0.02
	3	0.553±0.01^{a}	0.567±0.01^{a}	0.530±0.01^{b}
	6	0.487±0.01	0.503±0.01	0.480±0.01

Means in the same row with different superscripts differ significantly at $P<0.05$.

Microbial protein, did not show specific trend due to different silage rations. However, at 3 hrs post feeding, mixture silage was insignificantly higher than pure triticale silage respecting microbial protein content. Microbial protein content, was the least at 0 time, highest at 3 hrs post feeding then reduced at 6 hrs post feeding. Similar results were recorded by Haggag et al. (2002) who reported that the highest value of microbial protein was recorded with forage mixture included 50% triticale and 50% berseem (0.528) and the lowest with triticale forage (0.396), whereas group fed berseem forage recorded medium value (0.490).

Data of rumen total VFA's concentrations as well as proportions of individual VFA's % are presented in Table 3. Total VFA's concentration of G2 was significantly higher than G1 but not significantly higher than G3 at 3 & 6 hrs . Similar results are recorded by Ahmed et al. (2013) who found that rumen TVF's concentration post-feeding was significantly higher with mixed silage compared with sole berseem or triticale silage. Generally, the highest concentration of total VFA's was found at 3 hrs post-feeding which was reflected on lowering pH values at that time as reported by Shehata et al. (2006) and Ahmed and El-Kholany (2012).

Percentages of acetic and propionic acids were significantly higher with mixed silage, followed by triticale silage while the least percentage was with berseem silage ($P<0.05$). Inversely, butyric acid concentration was the lowest in G_2 and highest with G_1 ($P < 0.05$).No significant differences were noticed in percentages of valeric, isovaleric and isobutyric among the experimental rations. Similar results were observed by McCartney and Vaage (1994). In this respect, Fisher (1972) reported that the molar proportion of acetate and the ratio of acetate to propionate in rumen fluid were significantly higher ($P<0.05$) for cow fed triticale silage than fed corn silage. The same author observed that butyrate in the rumen fluid was lower with triticale silage compared with corn silage.

Blood parameters

Data of blood serum parameters are presented in Table 5. The results indicated that most blood parameters were not significantly affected by tested silages that incorporated in the experimental rations (G1, G2 and G3).

Blood urea was significantly lesser with triticale silage and its mixture with berseem than that of sole berseem silage ration, while blood glucose concentration being behaved vice versa. It is of interest to report that rumen NH3-N concentrations (Table 3) had the same trend of blood urea among dietary treatments. These findings were supported earlier by El-Shaer et al. (1982) who noticed high and significant correlation between serum urea-N and rumen ammonia-N for both sheep and goats. Calcium and phosphorus levels were higher with mixture silage ration than those of sole triticale or berseem silages. Magnesium did not show significant difference due to treatments applied. The enzyme activities (AST and ALT) were decreased with berseem silage than triticale or its mixture with berseem but without significant difference due to treatments.

Generally, the obtained results indicate that blood components measured showed slight differences due to the source of silages, while all levels were within the normal ranges which had been reported by Kaneko (1989) for healthy goats and on line with the findings of Haggag et al. (2002) who used triticale and berseem forage and their mixtures in small ruminant rations.

Digestibility and feeding values

Data in Table 6 indicates that digestibility of OM, CF, CP and EE were higher ($P<0.05$) with mixture silage ration (G_2) than those of berseem silage (G_1) or triticale (G_3) ones. Digestibility of DM was similar for rations of G1 and G2 where both were significantly higher than that of G3. Also, the same trend was found among treatments in respect of NFE. The feeding values as TDN was also significantly higher with mixture silage, than that of berseem or triticale silage rations. Comparatively, the digestibility and feeding values were in favor to the mixed silage (berseem /triticale) compared to the sole silages. Concerning DCP estimation, its values were significantly higher with G1 and G2 than that of G3 and this effect is largely due to the high content of CP with leguminous forages. Similar findings were reported by Ibrahim et al. (2012) and Ahmed et al. (2013) with mixture silages fed to Rahmani sheep and Zaraibi goats, respectively. This positive effects of mixture silages (or forages) on digestibility and feeding value were observed also by Soliman et al. (1997), Haggag et al. (2002) and El-Kholany (2004) when used mixed forage or silage in diets of sheep and goats.

Table 4: Effect of feeding experimental rations on rumen TVFA's and fraction VFA%.

Items	Hours	Groups		
		G_1	G_2	G_3
Total VFA"s (mEq/100ml)	**0**	8.97 ±0.27	9.20±0.25	9.10±0.15
	3	12.03±0.28^{b}	13.27±0.24^{a}	12.73±0.28^{ab}
	6	11.00 ±0.25^{b}	12.07±0.23^{a}	11.60±0.26^{ab}
		Ruminal TVF's **(%)**		
Acetic		47.43±0.48^{c}	51.47±0.28^{a}	49.57±0.43^{b}
Propionic		25.17±0.48^{c}	28.93±0.38^{a}	27.03±0.29^{b}
Butyric		19.03±0.58^{a}	12.03±0.52^{c}	15.27±0.19^{b}
Valeric		3.03±0.27	3.27±0.23	2.63±0.17
Isobutyric		3.00±0.17	3.03±0.20	3.10±0.20
Isovaleric		2.33±0.18	2.27±0.32	2.40±0.32

Means in the same row with different superscripts differ significantly at P<0.05.

Table (5): Effect of feeding experimental rations on some blood serum parameters**.**

Items	Groups		
	G_1	G_2	G_3
Total protein, g/dl	6.47±0.09	6.30±0.15	6.40±0.10
Albumin(A), g/dl	2.93±0.07	2.90±0.10	3.00±0.12
Globulin(G), g/dl	3.53±0.12	3.40±0.12	3.40±0.06
Urea, mg/dl	44.0±0.58^{a}	41.33±0.67^{b}	40.00±0.58^{b}
Glucose , mg/dl	49.67±1.45^{b}	54.33±1.76^{ab}	56.0±1.53^{a}
Cholesterol, mg/dl	79.67±3.53	78.00±2.65	81.0±3.46
AST, u/l	64.67±2.03	66.33±2.67	68.0±3.61
ALT, u/l	17.50±0.87	19.67±1.59	18.33±1.59
Calcium, mg /dl	10.43±0.09^{ab}	10.60±0.10^{a}	10.17±0.09^{b}
Phosphorus, mg/dl	8.20±0.12^{b}	8.70±0.12^{a}	8.33±0.15^{ab}
Magnesium, mg/dl	2.47±0.15	2.53±0.15	2.30±0.15

Means in the same row with different superscripts differ significantly at P<0.05.

Table 6: Digestibility and feeding values of experimental rations fed to Rahmani sheep.

Items	Groups		
	G_1	G_2	G_3
Digestibility (%):			
DM	65.06±0.32^{a}	66.11±0.42^{a}	63.71±0.20^{b}
OM	67.14±0.28^{b}	68.17±0.30^{a}	65.90±0.22^{c}
CF	55.23±0.69^{b}	57.72±0.19^{a}	54.71±0.04^{b}
CP	74.76±0.65^{b}	76.68±0.19^{a}	74.59±0.36^{b}
EE	75.33±0.41^{c}	78.03±0.24^{a}	76.89±0.31^{b}
NFE	69.66±0.51^{a}	69.87±0.58^{a}	67.87±0.25^{b}
	Feeding values (%, on DM) :		
TDN	63.50±0.21^{b}	65.19±0.22^{a}	63.70±0.13^{b}
DCP	10.82± 0.10^{a}	10.60±0.02^{a}	9.81±0.05^{b}

Means in the same row with different superscripts differ significantly at P<0.05.

Table 7: Growth performance of Rahmani lambs fed the experimental rations.

Items	Groups		
	G_1	G_2	G_3
Initial weight (kg)	22.14 ±0.40	22.0 ±0.31	22.29 ±0.36
Final weight (kg)	37.09±0.29^b	38.34±0.17^a	36.86±0.24^b
Total gain (kg)	14.94±0.20^b	16.34±0.17^a	14.57±0.17^b
Daily body gain (g)	133.4±1.77^b	145.9±1.56^a	130.1±1.52^b
Daily feed intake, g/h/d:			
CFM	625	630	623
Silages	637	651	633
Total DM intake, g/h	1262	1281	1256
DM intake, g/kgw0.75	99.37	99.53	99.05
TDN intake, g/h	801	835	800
DCP intake, g/h	137	136	123
Feed conversion:			
kg DM/ kg gain	9.46	8.77	9.65
kg TDN / kg gain	6.00	5.72	6.15
kg DCP / kg gain	1.03	0.93	0.95

Means in the same row with different superscripts differ significantly at P<0.05.

Growth performance

Growth performances of lambs, in relation to different treatments, are presented in Table 7. Mixed silage significantly achieved the highest rate of gain (145.9 g/d) while both berseem or triticale silage rations had similar trend of daily gain (133.4 & 130.1 g/d, respectively)

The preference of mixed silage ration (G_2) are coped with the positive effect of this treatment on most rumen fermentation parameters, digestion coefficients and feeding values indicated in the present findings and also those reported by Soliman et al. (1997) and Ibrahim et al. (2012) who used mixed forages (or silages) for diet of Zaraibi kids and Rahmani lambs, respectively. Similar results were observed by Ahmed et al. (2013), who found that using of berseem – triticale silage mixture with CFM in dairy Zaraibi goats had clear positive effect on productive performance especially milk yield and composition compared with berseem or triticale silage with CFM.

Feed conversion efficiency

The average daily feed intake and feed conversion rate of lambs are summarized in Table 7. Concerning daily feed intake, the animals consumed approximately similar quantities of DM (ranged from 99.05 to 99.53 g/kg$^{0.75}$). In the same time, TDN intake tended to increase with G_2 (835g/h) compared with G_1 and G_3(801 and 800 g/h, respectively). But, DCP intake was higher with both silages of berseem and its mixture with triticale, while the lowest value was recorded with sole triticale silage ration (123 g/h). Feed utilization efficiency based on DM, TDN and DCP was better with mixed silage ration compared with the other silage ones. Similar results were observed by El-Kholany (2004) and Ahmed et al. (2013) using mixture silages in Zaraibi goat's rations. In a study on growing Zaraibi males, Soliman et al. (1997) found that feed efficiency based on DM and TDN was greatly better with CFM + sesbania – teosinte mixture (8.77 and 6.04, respectively) compared with CFM + Sesbania alone (11.81 and 7.73, respectively) and CFM + teosinte alone (16.24 and 10.43, respectively). In this respect, Ibrahim et al. (2012) observed that feed conversion rate based on DM and TDN was better with growing Rahmani lambs fed mixed silage (legume and grass) than those fed cowpea or Millet × Napier grass hybrid alone.

CONCLUSION

The present study indicates that mixture silage ration had the best effect on digestion

coefficients, growth performance and feed conversion efficiency without any negative effects on ruminal metabolic parameters and blood profile. Thus, it could be concluded that the mixture silage of 50% triticale- 50% berseem was the best as roughage supplement for feeding growing sheep.

REFERENCES

Ahmed, B. M. (1998). Influence of moisture / additive interrelationship on silage quality of Rhodes grass (chloris gagane). Proc. Saudi Biological Socity, 18th annual meeting held at the royal commission for Toubail and Yanbu. Kingdum of Saudia Arabia, 24- 26 feb.

Ahmed, M. E., A. M. Abd el-Gwad, E. l. Shehata and S. A. Tawfik (2011). Influence of using feed forage in different forage as fresh , silage and hay on blood profile and carcass quality of growing Rahmani sheep. Egyptian J. of sheep and goat Sci., 6 (2) : 25.

Ahmed, M. E., A.M. Abdelhamid, F.F. Abou Ammou, E.S. Soliman, N.M. El-Kholy and E. l. Shehata (2001). Response of milk production of Zaraibi goats to feeding silage containing different levels of teosinte and kochia. Egyptian J. Nutrition and Feeds, 4: 141.

Ahmed,M. E. and M.E. El-Kholany (2012). Productive performance, some rumen parameters and blood profile of Zaraibi goats fed rations supplemented with chufa tubers during late pregnancy and suckling periods. J. Animal and poultry.

Ahmed M.E., E.I. Shehata, M. E. El-Kholany, G.I. El-Emam, E.I. Khalifa and H. Bahery (2013). Productive performance of Zaraibi goats fed berseem and/or triticale silage. The 4th Scientific conference of Animal Production Research Institute, 184:192.

Ahmed, B. M., H. T. Taie, M. M. Bendary and K. F. Abdel-Latif (2003). Influence of dietry corn silage on digestibility, performance and economical efficiency of dairy cattle Egyptain J. Nut. And Ffeeds, 6 (SP. ISS.) : 587 – 594.

A.O.A.C. (1995). Official Methods of Analysis (16th Edit). Association of Official Analytical Chemists, Washington, D.C., USA.

Conway, E.F.(1957). Micro diffusion Analysis and Volumetric Error. Rev. Ed. Lock Wood, London.

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

El-kholany M. M. (1998). Substitution of sweet sorghum or clover by reed plants in rations of locating goats. M.Sc. Thesis, Fac. of Agric., Mansoura Univ.

El-Kholany, M. M (2004). Evaluation of some new green fodder for Farm animals. Ph.D. Thesis Fac. of Agric, Mansoura Univ.

El-Shaer, H.M., N.E. Hassan, A.M. El-Serafy and M.A. El-Ashry (1982). Nutritional studies on pastures indigenous to Sothern Sinai.111. Effect on levels of supplements on some rumen and blood metabolites in sheep and goats. 6th int. Conf. Anim. and Poult. Prod., Zagazig, Sept. 20-23, PP: 115.

El-Shinnawy, M.M., M. Y. El-Ayek, E. I. Shehata, M. E. Ahmed and W. M. A. Sadek (2004) . Response of partial replacement of protein by urea with addition of bentonite clay in Rahmani sheep. 7th Vet. Med. Zag. Conference (21-23 July. 2004) Sharm El-Sheikh. Pp: 88.

Everson, R. A., N. A. Jorgensen and G. P. Barrington (1971). Effect of bentonite, nitrogen source and stage of maturity on nitrogen redistribution in corn silage. J. Dairy Sci., 54: 1482-1490.

Fisher, L. J. (1972) . Evaluate of triticale silage for lactating cow. Animal Research Institute, Research , Branch, Canada Agriculture, Ottawa, Ontario. 52: 373 – 376 (June 1972).

Gabra, M. A. (1984). Studies on the productivity and feeding qualities of some annual and perennial forages as affected by some agronomic practices fed to sheep in metabolism trails . PH . D. theses, Fac. Agric. Cairo Univ.

Haggag, M. El-H., E. S. Soliman and M.E. Ahmed (2002). Triticale forage as a feed

for sheep. Proc., 1st Ann. Sc. Conf. Anim. and Fish Prod, P. 77- 83. Mansoura, Sep,.

Hungate, R. E. (1966). The rumen and its microbes . Acad. Press, NY, London

Ibrahim, F.A , M. E. Ahmed and A. S. Soliman (2008). Cultivation and evaluation of some green forage mixture and its utilization in feeding of lactating Zaraibi goats. Egyptian J. Nutrition and Feeds, 11 (2): 329.

Ibrahim, F.A., Soliman, E.S, A. A. Abd El-Hamid and M. E. Ahmed. (2012). Growth performance and feed utilization efficiency of Rahmani lambs fed some legume and /or grass silages. Egyptian J. of Sheep and Goats Sciences, 7 (2): 1- 10.

Kaneko. I.H. (1989). Chemical Biochemistry of Animals. 4th ED. Academic Press, Inc USA.

McCartney, D. H. and A. S. Vaage (1994) . Comparative yield and feeding value of barley oat and triticale silages. Can. J. Anim. Sci. p: 91-96.

Mooso, G. D. and W.F. Wedin (1990). Yield dynamics of canopy components in Alfalfa Grass mixtures. Agric. J. 82 (4): 696.

NRC (1985). Nutritional requirements of domestic animals. Nutrient requirements of sheep National Research Council, Washington.

Ranjhan, S. K. (1980). Animal Nutrition in Tropics. 1st Ed., Viks Publ. Housee, PVI India, Delhi.

Saddick, I. M., B. M. Ahmed, A. A. Kandil and G. F. Shahin (1993). Productive perfprmance of Ossimi lambs fed silage-Containing rations. Menofiya J. Agric, Res. 18 (2) : 1111 -1142.

Sadek, W.M.A. (2011). Nutritional requirements of Rahmani ewes. Ph. D. Thesis, Fac. Agric., Mansoura Univ..

SAS Institute (2003). SAS/STATR User's Guide: statistics. Ver. 9.1, SAS Institute Inc., Cary, NC, USA.

Shehata E.I; M.E. Ahmed, A.M. Abdelhamid, Faten F. AbouAmmou, and M. El-H. Haggag (2001) Comparative nutritive values of silage ration containing different level of teosinte and kochia. Egyptian J. Nutrition and Feeds, (4):129.

Shehata, E.I., M.E. Ahmed, Faten. F. Abou Ammou, A.A. M. Soliman, K.M. Aiad and A.M. Abdel-Gawad (2006). Comparison of feeding reed as hay or silage with feeding berseem hay or maize silage to dairy Zaraibi goats. Egyptian Sheep Goats and Desert Animals Sci., 1(1): 233-247.

Soliman, E.S, A.E.M. Kinizy, Bahira K. Mohamed and M. El-H. Haggag (1997). Studies on using sesbania and Teosinte forage in feeding of growing Zaraibi goats Egypt. J. Appl. Sci.,12 (5) : 36.

Tawfik, S.A, M.E. Ahmed, E.I. Shehata and O.B. EL-Gazzar (2005). Effect of adding chamomile flowers to aflatoxins contaminated diet on growth performance, rumen parameters and some blood components of growing lamb's.4th Int. Sci. Conf., Mansoura. 251.

Van Keulen, J and B. A. Young (1977). Evaluation of acid insoluble ashAsa natural marker in ruminant digestibility studies. J. Anim. Sci., 44 (2): 282.

Warner, A.C.I. (1964). Production of volatile fatty acids in the rumen, methods of measurements. Nutr. Abst. & Rev., 34: 339.

Zo Bell, D.R, Goon Ewardene, L. A. and Engstrom, D.F. (1992). Use of triticale silage in diets for growing steers. Can. J. Anim. Sci.: 72: 181- 184.

الملخص العربى

معدلات النمو وبعض مقاييس سائل الكرش والدم للأغنام الرحمانى النامية المغذاة علي سيلاج التريتيكال أو سيلاج البرسيم أو مخلوطيهما.

جمال إبراهيم الإمام[1]، يوسف حسين حافظ[2]، هشام رجب بحيرى[2]، عز الدين إبراهيم خليفة[2]، عصام الدين إبراهيم شحاتة[2]، محمد إبراهيم أحمد[2].

[1] قسم بحوث استخدام المخلفات- معهد بحوث الإنتاج الحيواني – الدقي – جيزة – مصر.

[2] قسم بحوث تربية الأغنام والماعز - معهد بحوث الإنتاج الحيواني – الدقي – جيزة – مصر.

بهدف تقييم سيلاج التريتيكال مقارنة مع سيلاج البرسيم، تم تنفيذ تجارب هضم ونمو على 21 حمل رحماني ، 7 في كل مجموعة. غذيت جميع الحيوانات مخلوط أعلاف مركزة (CFM) لتغطية 50% من الاحتياجات التي أوصى بها NRC (1985)، إلى جانب ذلك تم التغذي حتى الشبع على طرز السيلاج المختبرة، حيث قدم سيلاج البرسيم للمجموعةG1 وسيلاج التريتيكال لـ G2 والسيلاج المكون من 50% برسيم و 50% تريتيكال إلى G3. واستمرت المعاملة لمدة 112 يوما. وبالإضافة إلى ذلك، أشرك ثلاث حملان من كل مجموعة في تجربة هضم لتقدير معاملات الهضم والقيمة الغذائية للوجبات الغذائية المختبرة.

أظهرت النتائج التي تم الحصول عليها أن معاملات هضم OM و CF و CP و EE كانت أكثر معنويا مع سيلاج الخليط عن السيلاج الفردي المحتوى. معاملي هضم CP وADL انخفضتا مع سيلاج التريتيكال عن سيلاج البرسيم.

كما كانت الاختلافات في DM، ADF اكثر محدودية. قياسات الكرش أظهرت أن نيتروجين الأمونيا والبروتين الميكروبي كانا اكبر مع سيلاج البرسيم (ج 1) مقارنة بالمجموعات الأخرى، والأحماض الدهنية الطيارة أظهرت أقل تركيزات لها عقب التغذية مع سيلاج البرسيم مقارنة بسيلاج التريتيكال. أما قياسات سائل الكرش للأحماض الدهنية الطيارة فأظهرت ارتفاع تركيز حمضى الأسيتات والبروبيونات وإنخفاض تركيز البيوترات مع السيلاج المخلوط (ج2) مقارنة بالمجموعات الأخرى.

معاملات الهضم لمعظم العناصر الغذائية (OM, CF, CP و EE) كانت أعلى معنويا مع الأغنام المغذاة سيلاج مختلط عن المغذاة سيلاج الترتيكال أو البرسيم منفردين. وهكذا فإن المواد الكلية المهضومة (TDN) للسيلاج الخليط كانت الأعلى (ف < 0.05) مقارنة مع انواع السيلاج الأخرى. أما البروتين الكلى المهضوم (DCP) فكان أعلى مع سيلاج البرسيم، وأقل قليلاً مع السيلاج المختلط والأقل معنويا مع سيلاج التريتيكال.

معدل النمو اليومي للجسم سجل أعلى قيمة (145.9 جم/يوم) مع السيلاج المختلط و تلاها سيلاج التريتيكال (133.4 جم/يوم) والأقل مع سيلاج البرسيم (130.1 جم/يوم) (ف < 0.05).

وبذلك يستنتج أن السيلاج المخلوط (50% تريتيكال – 50% برسيم) أفضل من المنفرد فى تغذية الأغنام الرحمانى النامية لتأثيره الايجابي علي تخمر الكرش والهضم وقد انعكس ذلك علي التحسين المعنوي في كفاءة ومعدلات النمو في الأغنام.