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NUTRITIONAL STUDIES ON SOME CONSERVED LEGUMINOUS FORAGES FED TO SHEEP IN METABOLISM AND GROWTH TRIALS

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Abstract

Egyptian clover, berseem (*Trifolium alexandrinum* L.), Alfalfa, lucerne (*Medicago sativa* L.) and cowpea (*Vigina sinensis* L.) were sown in newly reclaimed soils. After cutting, the green forages were sun cured on ground in the open air to obtain hay for chemical analysis, metabolism and feeding trials. The losses of DM and nutritive values during drying process were calculated. Seven metabolism trials using mature sheep were carried out to determine the feeding values of hays and daily intake. Three growth trials were undertaken with Ossimi lambs fed hays *ad libitum* plus concentrate feed mixture (CFM) which was offered at 1% of body weight as follows: group A fed berseem hay (BH) + 1% CFM, group B fed alfalfa hay (AH) + 1% CFM and group C fed cowpea hay (CH) + 1 % CFM. Growth rate, feed intake and feed conversion efficiency were calculated during 98 days experimental period.

Results showed significant differences ($P<0.05$) among the experimental hays in their contents of nutrients, energy, fiber fractions and minerals. The means of feeding values as TDN, SV, DCP and digestible energy (DE) were significantly the highest with AH than BH and CH. Daily DCP intake for adult sheep could fulfill protein requirements and still allows surplus for production, while, SV intake could not fulfill the energy requirements recognized for adult sheep. Losses of DM and CP yields were significantly the lowest in CH followed by AH and BH being 25.9-32.4% for DM and 40.8-54.5% for CP. However, losses of SV and DCP were significantly the lowest in AH followed by CH and BH being 45.8-54.4% and 30.0-60.5% for SV and DCP, respectively.

Supplementation of CFM with different hays improved most nutrients digestibility and nutritive values of the tested rations. During the experimental period, the daily gains were 107, 122 and 89g for group A, B and C, respectively, with significant differences among groups. This trend was shown also with feed conversion which was significantly the hightest with group B than with groups A & C.

INTRODUCTION

The main obstacle for improving animal productivity in Egypt is the shortage of feedstuffs and their distribution around the year. In winter, the production of animal feeds is mainly dependent on berseem (*Trifolium alexandrinum. L.*) while there is a lack of feed resources in summer. Owing to the increased demand on animal protein, many

attempts were done to improve feed sources, to introduce new forage and for conservation of some forages as hay or silage. So, preserving a significant amounts of green forages is more valuable to curb the steady feed shortage, especially during summer season and to balance the feed supply along the year as well. On the other hand, hay which is still considered the main summer feedstuff, is still made by primitive method.

The present study was designed to evaluate berseem (*Trifolium alexandrinum L.*), alfalfa (*Medicago sativa L.*) and cowpea (*Vigna sinenses L.*) hays nutritionally concerning the chemical quality, digestibility coefficients and nutritive values of conserving forages and its effect on performance of sheep during feeding trial.

MATERIALS AND METHODS

Field trials

The field trials were conducted at Nubaria during seasons 1996 and 1997 using new sandy soils. All the agricultural practices were done. The land was divided into blocks, each one subdivided into six equal plots. The plot was $12m^2$ being 1/350 of feddan. The experimental plots were designed using the randomize complete block method, and six replicates were applied for each crop. Berseem, alfalfa and cowpea were sown at rates 24, 12 and 24 kg seed/feddan, respectively. Phosphorus and nitrogen fertilization were applied for all crops at rate of 150kg super phosphate and 7.5 kg nitrogen/feddan before sowing. Three cuts of berseem, alfalfa and one cut of cowpea were taken to prepare hay. Hay was made from the experimental forages by sun drying using the usual ground method.

Seven metabolism trials were carried out using sheep fed on hays of the 2nd, 3rd and the 4th cuts of berseem (BH) and 1st, 2nd and 3rd cuts of alfalfa (AH) and the 1st cut of cowpea (CH). Three rams were used in each trial which lasted for 18 days; the last 8 days were considered as a collection period. Dry matter intake (DMI) from the feed studied was recorded.

Feeding trials

Twenty-four Ossimi lambs with an average 20.7 kg live body weight (LBW) were divided into three equal groups based on their body weight. Lambs along the experimental period which lasted 98 days, received 1% CFM of their LBW. In addition, each of the experimental groups was randomly alloted to be fed *ad libitum* BH, AH and CH. Hays were offered to allow for approximately 10% residual. Feed residuals were

weighed and recorded once daily. Water and mineral blocks were available free choice. Animals were weighed weekly for adjustment of the concentrates allowance and to calculate the daily gain. Three metabolism trials were conducted with rams fed BH, AH and CH *ad lib* plus 1% CFM to determine the feeding values of the three rations.

Three tons of the 2nd cut of berseem, alfalfa and the 1st cut of cowpea were taken, then, dried on the ground in open air to obtain hay. When the moisture content reached a degree suitable for storage (15%) the hays were baled using a simple hand baler, then, weighed and stored to feed the growing lambs along the feeding trials.

Chemical analysis

Composite samples of feed and faeces were analyzed according to A.O.A.C. 1980. The gros energy (GE) was determined according to modified method of Khafagi (1967). Fiber fractions as neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were determined according to Goering and Van Soest (1975). Hemicellulose (Hcl.) and cellulose (Cell.) were defined by difference.

The mineral elements (Ca, Mg, Na, K, Zn, Mn, Fe, Fe, Cu and Co) were determined using Shimatzu Atomic Absorption Flame Spectrophotometer Model (AA-640-13). However, P determination was done by the method outline in Agriculture, the Fertilizers and Feeding Stuff (Amendment) Regulation (1976) using Perkin Elmer Spectrophotometer (model Lambda-1). All the possible precautions were taken to avoid metals contamination. Data were statistically analyzed according to Steel and Torrie (1980), and Duncan's multiple range test (1955) was applied whenever posible.

RESULTS AND DISCUSSION

Chemical analysis of BH and AH (Table 1) showed that CP content decreased and CF and ash contents increased with advance of cuts. The average of chemical analysis for the three hays indicated that CP, CF, EE and ash percentages were significantly higher ($P<0.05$) in AH, CH and BH, respectively. Gross energy was also higher with alfalfa than with the other forages and being in average 390, 374 and 354 kcal/100 g DM of alfalfa, cowpea and berseem hays, respectively. The averge of fiber fractions (Table 1) as NDF, ADF, ADF, ADL, Hcl. and Cell. were significantly the highest ($P<0.05$) in CH than BH and AH, without significant diffeences among the different cuts of berseem and alfalfa.

Chemical compositions of the experimental hay of forages in this study were in

Table 1. Chemical analysis and fiber fraction (%) of berseem, alfalfa and cowpea hays.

Items	Chemical analysis (%) on DM basis				GE kacl/ 100 g DM	Fiber fraction (%)				
	Cp	CF	EE	ASh		ADF	NDF	ADL	ADL	ASh
Berseem hay										
2nd Cut	12.43	25.34	1.62	20.19	362.0	22.71	40.43	9.32	17.72	13.39
2rd Cut	11.04	2.18	1.72	22.26	350.0	22.17	40.17	10.07	19.00	12.10
4th Cut	10.84	27.01	1.75	22.33	351.0	22.00	39.31	10.00	17.31	12.00
AV.	11.43 c	26.17 b	1.69 c	21.59 c	354.0 c	22.29 c	40.30 c	9.79 b	18.01 b	12.49 b
SE+.	0.43	0.47	0.08	0.69	3.83	0.20	0.53	0.23	0.50	0.44
Alfalfa hay										
1st Cut	17.42	22.33	1.88	11.53	393.0	30.54	47.90	8.44	17.36	22.10
2nd Cut	17.73	24.81	1.92	12.80	390.0	32.54	47.51	8.32	17.97	24.22
2rd Cut	16.11	25.62	1.67	14.04	386.0	32.04	47.51	8.19	15.47	23.85
AV.	17.08 a	24.25 c	1.82 b	12.79 c	390.0 a	31.70 b	47.64 b	8.31 c	16.93 c	23.39 a
SE+.	0.49	0.98	0.05	0.72	2.01	0.59	0.12	0.05	0.75	0.64
Cowpea hay										
1st Cut	13.55 b	30.31 a	2.91 a	14.69 b	374.0 b	33.70 a	52.55 a	10.12 a	18.85 a	23.58 a

a, b and c: not followed by the same letter are significantly different at ($p<0.05$).

Table 2. Averages of major and trace element contents of experimental hays.

Items	Major elements (%).					Trace elements (mg/kg DM)				
	Ca	P	Mg	Na	K	Zn	Mn	Fe	Cu	Co
Berseem hay										
2nd Cut	1.50	0.32	0.30	0.68	2.36	22.40	147.10	82.10	7.92	0.16
2rd Cut	1.63	0.31	0.33	0.61	2.31	20.10	148.20	80.60	7.96	0.17
4th Cut	1.66	0.31	0.30	0.67	2.29	23.20	150.30	80.00	7.01	0.13
AV.	1.60	0.31	0.31	0.65 b	2.32 b	21.90 c	148.53 b	80.90 b	7.63 c	0.15
SE+.	b	0.00	b	0.04	0.05	0.92	0.93	0.62	0.30	0.05
Alfalfa hay	0.01		0.01							
1st Cut		0.33		0.93	0.34	41.04	196.12	87.80	9.00	0.14
2nd Cut	1.85	0.30	0.28	0.84	0.35	36.26	175.69	86.00	8.62	0.15
2rd Cut	1.87	0.26	0.21	0.69	0.30	36.54	173.53	83.50	7.92	0.15
AV.	1.72	0.30	0.21	0.82 a	0.33	37.95 a	181.79 a	85.77 a	8.51 b	0.15
SE+.	1.81 a	0.04	0.32 a	0.15	0.04	1.54	7.19	1.24	0.31	0.04
Cowpea hay	0.02		0.04							
1st Cut		0.31		0.41 c	3.31 a	23.00 b	148.20 b	74.90	9.30	0.15

a, b and c: not followed by the same letter are significantly different at ($p<0.05$).

agreement with those recorded by Danasoury *et al.*, (1971), Beshay (1980), Kurar (1983), Gupta *et al.*, (1985), El-Gallad *et al.*, (1988) and Etman *et al.*, (1998) with slight differences. These, differences are mainly due to some essential factors such as type of soils, fertilization, plant maturity, intervals between cuts, weather conditions and the method of hay making (Abou-Raya *et al.*, 1969, Danasoury *et al.*, 1971 and Mostafa *et al.*, 1998).

Concerning mineral contents of experimental hays (Table 2), P,Mg, K, Zn, Fe, Cu and Co decreased, and Ca and Mn increased with successive cuts of berseem and alfalfa hays. Averages of Ca, Na, K, Zn, Mn and Fe in alfalfa hay were significantly higher than in BH, and followed by CH. However, contents of Mg and Cu were higher significantly in CH. The average mineral comtent of hays and their trend through the successive of average mineral content of hays and their trend through the successive of cuts are in harmony with some exception to those recorded by Allam *et al.*, (1980), Sherif and Gabra (1985) and Gabra *et al.*, (1990 & 1993a) for other leguminous forages. The mineral contents varied according to many factors, among those are the age of plant, the soil and fertilization, differences among species, and varieties, season of the year and cutting intervals. The decrease or increase of some minerals with the advance of age and/or growth of the plant are due to the dilution effect of there elements in the vegetative dry matter produced and accumulated, and due to other factors such as a diminshing capacity of the plant to absorb nutrients from the soil and variation in the stem: leaf ratio (Underwood, 1977, Shalaby *et al.*, 1984 and Gabra *et al.*, 1993b). On the other hand, these differences between the green forage and its hay may be due to differencences in stem : leaf ratio of hay during its process and/or due to soil, fertilization and dust contaminations.

Results in Table 3 showed that digestion coefficients of all nutrients and energy for berseem and alfalfa hays were decreased with subsequent cuts. Digestibility of CP, EE, CF, NFE and energy were the highest ($P<0.05$) in berseem and alfalfa hays, while, DM and OM digestibility were the highest in cowpea. Feeding values as TDN, SV and DCP followed the same trend of digestion coefficients and decreased with the successive cuts. The highest values were recorded with alfalfa hay which contained the average 55.48%, 40.45% and 10.73% for TDN, for TDN, SV and DCP, respectively, being significantly ($P<0.05$) than berseem and cowpea hays. This trend was shown also with DE, being 257, 256 and 240 kcal/100 g DM for AH, CH and BH, respectively. Differences in digestibility coefficients and feeding values among the experimental hays, probably, are attributed to the biological and natural effects accompanied to the hay process. Results of feeding values of berseem hay in this study were in agreement with

Table 3. The digestibility and feeding values of berseem, alfalfa and cowpea hays.

Items	Digestion coefficients (%).							Feeding values (%)			DE kcal/ 100 g DM
	DM	OM	Cp	CF	EE	NFE	Energy	TDN	SY	DCP	
Berseem hay											
2nd Cut	66.33	64.41	66.83	62.19	58.33	69.86	68.82	54.39	38.88	8.30	249
3rd Cut	60.74	58.18	63.21	61.67	56.67	66.30	67.91	51.01	35.08	6.97	238
4th Cut	57.0 3	54.20	58.39	58.86	54.17	63.18	66.82	48.37	32.33	6.32	234
AV.	61.36 b	58.93 b	62.81 a	60.90 a	56.39 a	66.44 a	67.85 a	51.25 b	35.43 b	7.19 c	240 b
SE+.	2.70	2.96	2.44	1.02	1.20	1.92	0.57	1.73	1.89	0.56	4.47
Alfalfa hay											
1st Cut	63.80	65.00	65.64	59.01	53.40	66.22	66.72	57.86	43.88	11.43	262
3nd Cut	61.81	63.92	62.30	57.29	52.90	65.18	65.91	55.37	39.97	11.04	257
2rd Cut	57.40	60.13	60.40	54.80	50.36	64.81	65.23	53.23	37.50	9.73	252
AV.	61.00 b	63.01 a	62.78 a	57.03 b	52.22 b	65.40 a	65.95 a	55.48 a	40.45 a	10.73 a	257 a
SE+.	1.88	1.47	1.53	1.21	0.93	0.41	0.42	1.33	1.85	0.50	288
Cowpea hay											
1st Cut	63.40 a	64.91 a	60.95 b	59.08 a	53.88 a	62.11 b	63.14 c	53.59 ab	34.98 b	8.25 b	256 a

a, b and c: not followed by the same letter are significantly different at ($p<0.05$).

Table 4. The daily dry matter and feed unit intakes of hays fed by sheep.

Items	LBW (Kg)	DM intake (Kg)	Intake/ 100 kg LBW	0.07 Daily intake (g/kg W)			
				DM	TDN	SV	DCP
Berseem hay							
2nd Cut	42.0	1.09	2.59	66.06	35.93	25.58	5.48
3rd Cut	42.0	1.09	2.59	66.06	33.69	23.17	4.60
4th Cut	43.0	1.10	2.65	65.48	31.67	21.16	4.14
AV.	42.3	1.09	2.61 b	65.86 b	33.76 b	23.30	4.74 c
SE+.	0.32	0.06	0.05	0.18	1.22	1.27	0.38
Alfalfa hay							
1st Cut	40.0	1.01	2.52	63.52	36.75	27.87	7.26
2nd Cut	41.0	0.99	2.41	61.11	33.84	24.42	6.75
3rd Cut	40.0	0.93	2.32	58.49	31.13	21.93	5.69
AV.	40.3	0.97	2.41 a	61.04 c	33.90 b	24.74	6.56 a
SE+.	0.32	0.01	0.03	1.44	1.61	1.72	0.45
Cowpea hay							
1st Cut	40.0	1.12	2.80 a	70.44 a	37.75 a	24.64	5.81 b

a, b and c: not followed by the same letter are significantly different at ($p<0.05$).

those recorded by Beshay (1980) and El-Gallad *et al.*, (1988). However, values of TDN and DCP were higher than those recorded by Etman *et al.*, (1998) and Mostafa *et al.*, (1998).

Regarding daily DM and feed unit intakes (Table 4), data indicated that animals consumed more DM of cowpea hay followed by berseem and alfalfa hays. Alternatively, Laredo and Minson (1973), Minson (1975), Burns *et al.*, (1985) and Gabra *et al.*, (1991 and 1993b mentioned that, voluntary intake was affected by some factors such as species of animals, forage age and maturity, intervals between cuts and leaf: stem ratio. The daily DM and TDN intakes/kg $W^{0.75}$ of cowpea hay and DCP of alfalfa hay were significantly higher ($P<0.05$) than the other hays. Dry matter intake/$W^{0.75}$ for all hays in this study (61.04-70.44g DM/kg $W^{0.75}$) was lower than the standard intake (80g DM kg/$W^{0.75}$) with lucerne hay as recorded by Abou-Raya *et al.* (1980).

Assuming 25g SV and 2-4 g DCP, as maintenance requirments for one kg W 0.75 were adopted as recommended by NRC, 1966). Therefore, the intake from BH, AH and CH for sheep (23.30-24.74 g SV and 4.74-6.56 DCP) could only fulfill protein requirements for maintenance, and besides surplus for production and could not fulfill energy requirements for adult sheep.

Dry matter and feed units losses in hay due to hay processes (Table 5) showed that the losses in DM of berseem hay were sigificantly the highest ($P<0.05$) followed by AH and CH. This trend was also recorded for CP, TDN, SV and DCP losses. On the other hand, losses in DM, TDN, SV and DCP were increased with successive cuts of berseem and alfalfa hays. Figures of losses in this study, either with DM or feed units with hay, were in agreement with those found by Ibrahim. (1969), and lower than those recorded by Danasoury *et al.* (1971) and Mostafa (1981), but were higher than those found by Beshay (1980). Increase or decrease of DM and feed units with hay process may be due to some factors affecting hays such as units with hay process may be due to some factors affecting hays such as order of cuts, forage maturity, season, weather condtions and processes of hay making, especially losses of the leaves which contain more CP content. In this connection, Danasoury *et al.* (1971) and Mostafa (1981) had adopted tripod curing method for conserving berseem, and showed better results.

Feeding trials

Calculated chemical analysis of experimental rations (hay + 1% CFM) in Table 6 showed that CP and NFE contents were the highest, while, ash was the lowest in alfalfa hay with concentrate (ration B) than with the other rations. Digestion of all the three

rations fluctuated around narrow figures.

Supplementation of CFM to hays improved and increased digestibility of nutrients and feeding values (Table 7) compared with those found with sheep fed hays alone (Table 3). These results are similar to those reported by Etman *et al.* (1998) and Mostafa *et al.* (1998).

Data obtained during feeding trials are given in Table 8 and Fig.1. Lamb tended to consume more feed as DM, SV and DCP from ration B (AH+CFM), in turn, they had achieved daily gain ($P<0.05$) than those fed rations A and B. The daily gain of lambs fed ration A (BH+CFM) was higher than those fed ration C (CH + CFM). The average daily intake and intake/kg $W^{0.75}$ was also higher with group B than with the other groups.

Concerning feed conversion as DM, SV and DCP per kg gain, they indicated that lambs of group B consumed more feed, and markedly showed better performance than those of groups A and C. Daily gain and feed conversion in this study were lower than those reported by Etman *et al.* (1998) with Saffolk lambs fed berseem hay with 2% CFM (160 g/d) and Mostafa *et al.* (1998) with Barki lambs fed berseem hay plus 2% CFM (143 g/d). However, these results are in agreement with those reported by Gabra *et al.* (1993c) when lambs were fed green berseem with 1% CFM.

In conclusion, using leguminous hay of berseem, alfalfa and cowpea in feeding animals, especilly in summer season under the newly reclaimed soil conditions could fill the gaps of shortage of green forages. Supplementation of concentrates to this conserved forages should be considered to improve the daily gain of lambs and to attain more efficiency as kg gain. Moreover, it is recommended to process hay from the 1st cut instead of delay to the last cut which is the common practice, as that proved to minimize losses in DM and nutritive value.

Table 5. Dry matter, CP and feed unit yields (ton/feddan) of fresh and hay forages and their losses.

Items	DM			CP			TDN			SV			DCP		
	fresh	hay	Losses in DM %	fresh	hay	Losses in CP %	fresh	hay	Losses in TDN	fresh	hay	Losses in SV %	fresh	hay	Losses in DCP %
Berseem hay															
2nd Cut	1.10	0.78	28.6	0.20	0.10	50.0	0.66	0.42	36.4	0.59	0.30	49.1	0.14	0.06	57.1
3rd Cut	1.05	0.72	31.6	0.18	0.08	55.5	0.62	0.34	40.3	0.55	0.25	54.5	0.12	0.05	58.3
4th Cut	1.06	0.67	36.9	0.17	0.07	58.8	0.62	0.32	48.4	0.55	0.22	60.0	0.12	0.04	66.6
Total	3.21 a	2.17 b	32.4 a	0.55 b	0.25 b	54.5 a	1.90 b	1.11 b	41.6 a	1.69 b	0.77 b	54.4 a	0.38 ab	0.15 b	60.5 a
Alfalfa hay															
1st Cut	1.07	0.78	26.8	0.24	0.14	41.6	0.67	0.45	32.8	0.57	0.34	40.3	0.12	0.09	25.0
2nd Cut	1.23	0.87	29.5	0.26	0.15	42.3	0.74	0.48	35.1	0.65	0.35	36.1	0.13	0.1	23.1
3rd Cut	1.35	0.92	31.9	0.23	0.12	47.8	0.75	0.48	36.0	0.68	0.34	50.0	0.15	0.09	40.0
Total	3.65 a	2.57 a	29.6 b	0.73 a	0.41 a	43.8 b	2.16 a	1.41 a	34.7 b	1.90 a	1.03 a	45.8 b	0.40 a	0.28 a	30.0 c
Cowpea hay															
1st Cut	2.62 c	1.94 c	25.95 c	0.44 c	0.26 b	40.9 b	1.61 c	1.04 b	35.4 b	1.48 c	0.68 b	54.0 a	0.34 b	0.16 b	52.94 b

a,b and c: not followed by the same letter are significantly different at ($P<0.05$).
Data of fresh forages were obtained from Gabra *et al.*, (1991) for cowpea, Gabra and Ghobrial (1992) for alfalfa and Gabra *et al.*, 1993 for berseem.

Table 6. Chemicaal analysis (%) of concentrate feed mixture, berseem, alfalfa, cowpea hays and rations fed.

Items.	Chemical analysis (%) on DM basis						
	DM	OM	CP	CF	EE	NFE	Ash
Concentrates (CFM).	100	89.26	16.93	14.66	3.14	54.53	10.74
Berseem hay (BH).	100	79.81	12.44	25.34	1.60	40.43	20.19
Alfalfa hay (AH).	100	87.20	17.22	24.81	1.92	43.25	12.80
Cowpea hay (CH).	100	87.08	15.78	30.08	2.91	38.76	14.69
Ration eaten (calculated).							
Ration A (BH + CFM).	100	82.66	13.78	22.12	2.05	44.71	17.34
Ration B (AH + CFM).	100	87.70	17.13	22.30	2.22	46.05	12.30
Ration C (CH + CFM).	100	86.48	14.56	25.50	2.98	43.44	13.52

Table 7. The digestibility and feeding values of feeding concentrate feed mixture with berseem, alfalfa and cowpea hays.

Rations.	Digestion coefficients (%).						Feeding values (%)		
	DM	OM	CP	CF	EE	NFE	TDN	SV	DCP
(A).	60.07	67.02	65.73	60.78	56.41	71.28	56.94	39.57	9.05
(B).	62.51	66.30	66.02	61.00	59.02	69.32	59.72	42.08	11.30
(C).	66.60	66.53	63.33	63.26	60.03	69.34	58.96	37.19	9.21

Table 8. Average body gain and feed conversion of different rations.

Items	Rations		
	(A)	(B)	(C)
Period (days)	98	98	98
Initial weight (kg)	20.61	20.70	20.90
Final weight (kg)	31.10	32.70	29.60
Daily gain (g)	107.0 b	122.0 a	89.0 c
Average daily intake (g)			
DM (g)	945.0 b	996.0 a	866.0 c
SV (g)	374.0 b	419.0 a	322.0 c
DCP (g)	85.5 b	112.5 a	79.8 c
0.75			
Average intake / kg W			
DM (g)	80.4 b	86.5 a	75.5 c
SV (g)	31.8 b	36.4 a	28.1 c
DCP (g)	7.3 b	9.8 a	6.9 c
Feed conversion (kg/kg gain)			
DM	8.80 b	8.20 c	9.70 a
SV	3.50	3.40	3.60
DCP	0.80 b	0.92 a	0.90 a

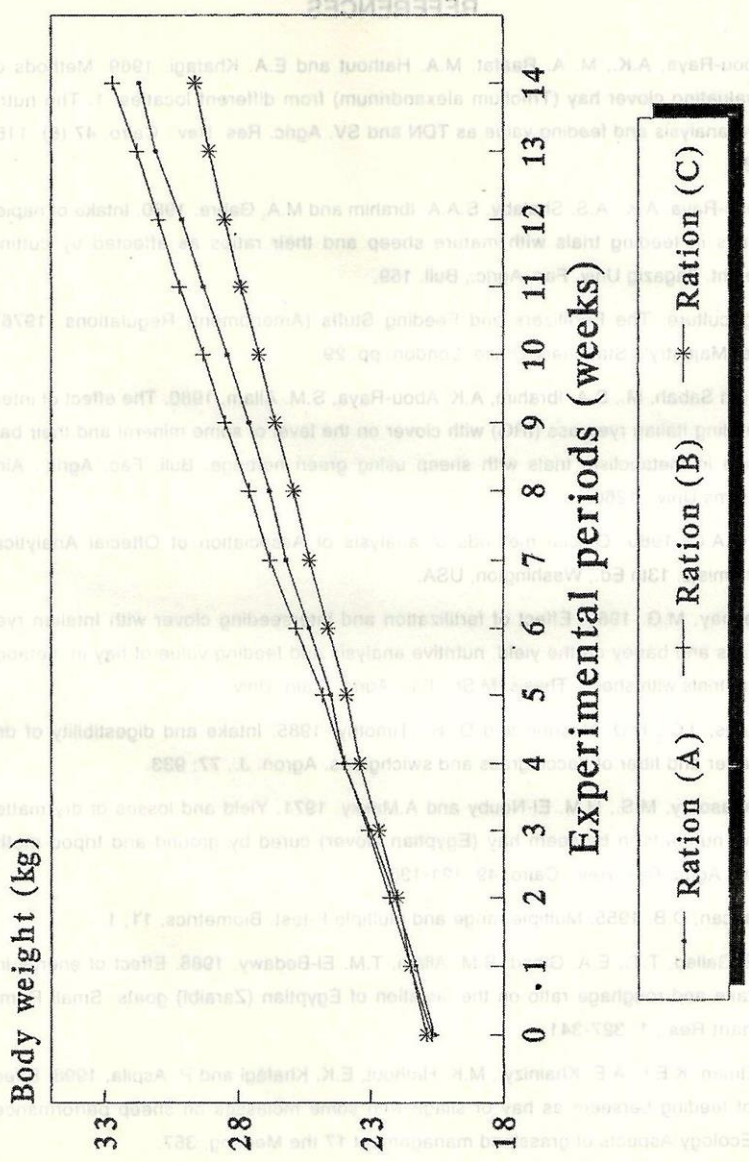

Fig 1. Changes of body weight of sheep fed the tested rations during 14 weeks experimental period.

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دراسات غذائية علي بعض الأعلاف الخضراء البقولية المحفوظة مع تغذيتها للأغنام في تجارب تمثيل غذائي ونمو

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إستخدم في هذا البحث ثلاثة أعلاف خضراء بقولية هي البرسيم الحجازي، البرسيم الحجازي، ولوبيا العلف المنزرعة في الأراضي المستصلحة. وبعد الحش جففت الأعلاف الثلاثة في الظروف الجوية العادية علي الأرض للحصول علي الدريس لإجراء التحليل الكيماوي وتجارب التمثيل الغذائي والنمو، كلما حسب الفاقد في المادة الجافة والقيم الغذائية للدريس. أجريت سبعة تجارب تمثيل غذائي مع الأغنام التامة النمو لتقدير القيمة الغذائية لانواع التدريس المختلفة وكذلك المتناول اليومي بواسطة الأغنام. كما أجريت ثلاث تجارب نمو للأغنام الأوسيمي بتغذيتها علي الدريس كما يلي :

أ) دريس برسيم مصري + ١٪ من وزن الجسم علف مركز.

ب) دريس برسيم حجازي + ١٪ من وزن الجسم علف مركز .

ج) دريس لوبيا العلف + ١٪ من وزن الجسم علف مركز، خلال فترة التجربة ومدتها ١٤ أسبوعا حسب معدل النمو اليومي للأغنام والمتناول اليومي ومعدل التحويل الغذائي.

اظهرت النتائج اختلافا معنويا علي مستوي ٥٪ بين أنواع الدريس المختبرة في محتواها من المركبات الغذائية، مكونات الألياف والعناصر الغذائية. وكانت القيم الغذائية كمركبات كلية مهضومة، معادل النشا والبروتين الخام المهضوم مرتفعة في دريس البرسيم الحجازي عن مثيلاتها في كل من دريس البرسيم المصري ودريس لوبيا العلف. كان المتناول اليومي بواسطة الأغنام من البروتين الخام المهضوم يكفي لتغطية حاجة الحيوانات من البروتين مع زيادة للنمو، بينما كان المتناول اليومي من معادل النشا لا يكفي حاجة الحيوانات من الطاقة. كان الفقد في محصول المادة الجافة والبروتين منخفضا في دريس لوبيا العلف عن دريس البرسيم المصري ودريس البرسيم الحجازي، وتراوحت نسبتة بين ٢٥,٩٪ - ٣٢,٤٪ للمادة الجافة، ٤٠,٨ - ٥٤,٥٪ للبروتين الخام، بينما كان الفقد في معادل النشا والبروتين الخام منخفضا في دريس البرسيم الحجازي عن دريس كل من البرسيم المصري ولوبيا العلف، وتراوح بين ٤٥,٨٪ - ٥٤.٤٪ ، ٥٣.٠ - ٦٠,٥٪ لكل من معادل النشا والبروتين المهضوم علي التوالي.

أظهرت نتائج تجارب النمو أن إضافة العلف المركز الي الدريس أدي إلي تحسين معاملات هضم المركبات الغذائية والقيم الغذائية، وكان متوسط النمو اليومي خلال فترة التجربة ١٠٧ ، ١٢٢، ٨٩ جم للمجموعات الثلاث أ ، ب ، ج علي التوالي، وقد انعكس ذلك علي معامل تحويل الغذاء حيث كان مرتفعا في حيوانات المجموعة ب عن المجموعين أ ، ج.