J. Agric. Sci. Mansoura Univ., 28(7): 5224 - 5237, 2003

GROWTH PERFORMANCE OF DAMASCUS KIDS AS AFFECTED BY FEEDING SYSTEM UNDER SEMI-ARID CONDITIONS OF NORTH SINAI.

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ABSTRACT

A total of 28 newly weaned Damascus kids were divided according to body weight into four groups of 6 kids (3 males + 3 females) with average initial weight of 12.92± 0.70 kg. Kids of G1 was fed on a basal ration (concentrate feed mixture and rice straw) according to the recommended NRC (1981) allowances, while G2 and G3 received 70% of their requirements from CFM and *ad lib.* green acacia or alfalfa to cover the remaing requirements . Group 4 was fed *ad lib.* on mixture containing 83% yellow corn, 15% soybeen meal, 1.4% ground limestone, 0.5% common salt and 0.1% vitamins and trace minerals. The results revealed that digestibility of all nutrients, except CF, and hence the feeding value were significantly ($P<0.05$) higher for kids fed diet 4 followed by diet3, 1 and diet2, respectively.

Average daily gain from initial weight to marketing weight (30 Kg) was significantly ($P<0.05$) higher for kids of G4 fed *ad lib.* on concentrate and reached marketing weight in almost half the period required by those on the other three diets, with no significant differences among groups 1, 2 & 3. Feed conversion as kg DM/Kg gain was the best with kids fed on diet 4 than the other three groups, which were practically similar. Feed cost/kg live weight gain was lower of G4 than the other three groups.

Since concentrates are not available of Sinai and are transported to Sinai from the Nile valley, while acacia plants grow all year round in Sinai and alfalfa is one of the promising forage crops to be cultivated in new reclaimed lands in Sinai, It could be concluded that, using green acacia and/or alfalfa with concentrates is recommended for fattening goat kids in North Sinai.

Keywords: Goat kids, feeding system, acacia, alfalfa, concentrate feed mixture, growth, digestibility, N utilization.

INTRODUCTION

The Damascus or Shami breed of goats is a native breed of Syria and other Near East countries (Constantinou, 1981). Damascus breed is considered the main breed in North Sinai especially in Rafah, Shiekh Zeyuied and El- Arish regions.

Feeding is one of the main factors limiting goat production *viz* meat, milk and hair (Morand- Fehr, 1992). Shortage of feedstuffs in Egypt and their relatively high prices specially imported ingredients makes it difficult to provide the animals with their nutritional requirements. This reflects a real loss in their productive performance and leads to high feeding cost (Mohamed *et al.*, 2001). The acute shortage in feed resources in summer season may be partially alleviated through more cultivation of promising new forages especially in the new reclaimed lands (Mostafa *et al.*, 2001). Green

forages are playing an important role in animal feeding systems. New reclaimed lands has a large potential in expanding animal production through forage cultivation. Alfalfa is one of the promising forage crops to be cultivated in these lands for its high nutritive value and its ability to increase soil fertility (Etman *et al.*, 1998a).

Acacia plants grow all year round in North Sinai. Acacia contains about 13 to 17% crude protein on DM basis (El- Shaer *et al.*, 1984; Abdel- Samee *et al.*, 1992; Abdulrazak *et al.*, 2000; Shetaewi *et al.*, 2001 and Mousa and Shetaewi, 2002). It can be potentially used as a feed ingredient for livestock (Felker, 1981; Kibon and Maina, 1993; Shetaewi *et al.*, 2001 and Mousa and Shetaewi, 2002).

Presence of anti-nutrtional factors in acacia forage, tannins in particular, can limit animal performance, especially when acacia is fed in large quantity. Acacia forage contains a high value of tannins (4-11% DM basis) as reported by Degen *et al.*, (1995) and Abou-El Nasr *et al.*, (1996). Previous studies revealed that when accasia was fed at large quantities to different farm animals, their performance was reduced mainly because of reductions of most nutrients digestibility coefficients, voluntry feed intake (Degen *et al.*, 1995) and N utilization (Sotohy *et al.*, 1997 and Nantoume et *al.*, 2001).

Accordingly, a number of ways are available that can increase the use of acacia forage as feed ingredient for livestock including urea- molasses mineral block and adding polyethylen glycol (PEG 4000) or polyethylen glycol (Pritchard *et al* 1985; Johnston, 1996; Ben Salem *et al* ,2000 and Moujahed *et al* ,2000).

The intake and dry matter digestibility of acacia are increased by supplementing sheep with molasses (Mc Meniman 1976) and sulfur content of the molasses (Hoey *et al* 1976), supplementary protein 50 g/head/day of cottonseed meal was given in addition to sulfur (Mc Meniman *et al* 1981)

Abou El-Nasr *et al* (1996) reported that sheep fed acacia silage utilized nutrients much better than given fresh acacia and acacia hay.

Feeding concentrates improves the intake and performance of goats (Morand- Fehr and Sauvant, 1987). The utilization of concentrates by goats depends largely on the socio- economical conditions and the production and availability of concentrates (Christopher and Rubino, 1992). In Egypt, fattening sheep and goats depends mainly on supplementary feeding rather than grazing (Shehata, 1997). Shehata, (1997), Shalaby (2000) and Mousa (2001) reported that fattening local Egyptian lambs on *ad lib.* concentrate increased daily gain up 225 g/h compared to 70-100 g/day for those fed traditionally. Similarly, in Cyprus, Hadjipanayiotou and Louca (1976) and Constantinou (1981) reported that the daily gain of Damascus kids fed *ad lib* on pelleted diet ranged from 200 to 240 g/h (17 and 18% CP on DM basis).

The objective of the present study was to investigate efficacy of using acacia or alfalfa as forages along with concentrated feed mixture compared with the proposed *ad lib.* Concentrate fattening system in terms of growth performance, feeding values, feed utilization and N utilization by Damascus kids under semi-arid condition of North Sinai.

MATERIAL AND METHODS

The present study was conducted at the farm of Animal Production Department, Faculty of Environmental Agricultural Sciences, EL-Arish, Suez Canal University. A total of 24 newly weaned Damascus kids were divided according to body weight into four groups of 6 kids (3 males+ 3 females). Average intial weights were 13.08, 12.75, 13.0 and 12.89 Kg, respectively. The four groups were alloted at random to four different diets from post-weaning to marketing weight (30 kg). The kids of the control group (G1) were fed a basal ration consisting of concentrate feed mixture and rice straw to cover their nutritional requirements according to NRC (1981) which was adjusted every two weeks according to body weight and growth rate. While the 2nd and 3rd groups were fed the concentrate feed mixture (CFM) to cover 70% of the total digestible nutrients (TDN) requirements and were offered green acacia or alfalfa *ad lib*, respectivily. Group 4 was fed *ad lib.* on a mixture containing 83% yellow corn, 15% soybean meal, 1.4% ground limestone 0.5% common salt and 0.1% vitamins and trace minerals, according to Shehata (1997) and Shalaby (2000).

The animals were watered *ad lib.* natural saline well water containing 3400 ppm total dissolved solids. The analysis of drinking under ground water was carried out using atomic absorption spectrophotometer according to Page (1982). The animals of each group were fed and housed in a 6X10 m^2 semi-open shaded pens.

Animals were individualy weighed at the begining of the experiment then every two weeks till marketing weight (30 Kg) and daily gain was calculated for each animal.

Digestibility and nitrogen balance trials were conducted before the commencement of the feeding trial to evaluat the experimental diets. Four animals were individually kept and fed in metabolic crates . The digestibility trial consisted of 14 days as a preliminary period and 7 days as a collection period. The concentrate feed mixture (CFM) to G1, G2 and G3 and feed mixture to G4 were offered twice a day in almost two equal parts at 8.00 and 16.00 h whereas roughage was offered to G1, G2 and G3 at 9.00h.

Samples of the experimental ingredients, acacia and alfalfa were taken for chemical analysis at the beginning of the collection period of the digestibility trials and the chemical composition of the consumed rations were calculated. During the collection period, total daily faecal output was collected and 20% sample was taken. Faeces, accacia and alfalfa were first dried at 65 $^{\circ}$ C in a forced air oven for 48 hours. The final dry matter of feed and feces were determined after drying in a forced air oven at 105° C for 24 hours. Dried samples were mixed and ground through in a willy mill with a 2 mm screen. Dry samples were kept in plastic vials at room temperature for the chemical analysis. Total daily urinary excreted from each kid was collected in a jar containing 100 ml of 20% H_2SO_4 to prevent ammonia loss. Daily samples of 10% was taken from each kid.

All animals were kept under the same managerial, hygienic and environmental conditions. Samples of feeds and feces were analyzed according to A.O.A.C. (1984) .

Data were subjected to statistical analysis by the computer program of SAS (1996) using the General linear Models (GLM). Differences between treatment means were tested for significancy ($P<0.05$) using Duncan multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition of the ingredients and the experimental rations:

The chemical composition of the ingredients used to formulate the experimental rations (Table 1) was within the normal ranges published in Egypt (El-Shaer *et al.*, 1984 and MAO, 1997). The calculated chemical composition of the consumed rations are also presented in Table1. The data showed that diets 2 and 3 which contained 70% CFM and *ad lib.* acacia or alfalfa had higher values of CP and CF than the other two diets. However, the lowest CP content was that of the control diet (1) which contained rice straw. On the other hand, diet 4 showed the greatest values of OM and NFE (95.45 and 74.61) compared with diets 1, 2 and 3 which contained 88.88, 90.8 and 90.18 (OM) and 56.34, 56.56 and 51.13 % (NFE), respectively. Concerning CF content, diet 4 recorded the lowest value (3.54%) because of its high level of yellow corn (83%) and without any roughage, followed by diets 2, 3 and 1, being 18.27, 23.76 and 23.99, respectively.

Table (1): Chemical composition of the ingredients and calculated chemical composition of the consumed rations (%).

Ingredients	DM	On DM basis						
		OM	CP	EE	CF	NFE	Ash	GE*
Soybean meal	88.78	92.09	41.89	1.94	8.05	40.21	7.91	18.92
Yellow corn	88.25	98.05	9.11	2.88	2.82	83.24	1.95	18.50
Concentrate feed mixture	89.02	90.36	17.06	2.95	11.14	59.21	9.64	17.67
Alfalfa	20.82	90.01	19.92	1.65	28.38	40.06	9.99	17.71
Acacia	31.28	91.42	14.22	1.70	22.76	52.74	8.58	17.61
Rice straw	91.28	81.65	3.59	1.15	39.33	37.68	18.35	15.48
Calculated chemical composition:								
Ration 1	89.46	88.80	10.89	2.79	23.99	56.34	11.20	18.17
Ration 2	63.75	90.83	15.94	2.56	18.27	56.56	9.17	18.16
Ration 3	53.65	90.18	18.65	2.46	23.76	51.13	9.82	18.83
Ration 4	88.86	95.45	14.62	2.68	3.54	74.61	4.55	18.28

Ration 1, concentrate feed mixture (CFM) plus rice straw.
Ration 2, concentrate feed mixture (CFM) plus acacia.
Ration 3, concentrate feed mixture (CFM) plus Alfalfa berseam.
Ration 4, A mixture containig 83 % yellow corn, 15% soybean meal, 1.4% ground limestone, 0.5% common salt and 0.1% vitamins and trace minerals.
***Gross energy concentration (MJ/Kg DM), calculated according to MAFF (1975) using the equation: GE MJ/kg DM= 0.0226 CP+ 0.0407 EE+ 0.0192 CF+ 0.0177 NFE.**
Where, CP, EE, CF and NFE are presented as g/kg DM.

Digestibility and feeding values of the experimental rations:

Data of the digestibility trials are presented in Table 2 showed highest digestibility coefficients of all nutrients, except CF, for kids fed diet 4 followed by rations 3, 1 and 2, respectively. This may be due to that ration 4 contained the lowest CF (3.54 %), the highest OM contents compared with the other three diets. The variation in the consumed concentrate: roughage ratio (Table 4) might also explain the variation in the digestibility of the nutrients.

Table (2): Digestion coefficients and nutritive values of the experimental rations.

Items	Experimental rations				
	1	2	3	4	± SE
Digestion coefficients (%)					
DM	65.18^{c}	56.23^{d}	71.82^{b}	85.86^{a}	0.30
OM	69.32^{c}	57.65^{d}	73.90^{b}	87.76^{a}	0.32
CP	66.96^{c}	52.52^{d}	79.16^{b}	81.85^{a}	0.55
EE	70.92^{c}	61.12^{d}	76.55^{b}	79.57^{a}	0.37
CF	52.42^{b}	50.25^{c}	62.50^{a}	39.62^{d}	0.36
NFE	73.14^{c}	62.21^{d}	76.50^{b}	81.97^{a}	0.27
Nutritive values (%)					
TDN	65.52^{c}	56.26^{d}	72.95^{b}	79.29^{a}	0.21
DCP	7.29^{d}	8.37^{c}	14.76^{a}	11.93^{b}	0.12
DE (MJ/Kg DM)*	11.69^{c}	9.95^{d}	12.66^{b}	15.91^{a}	0.056
ME (MJ/Kg DM)**	9.58^{c}	8.16^{d}	10.38^{b}	13.05^{a}	0.046

a-d Means in the same row with different superscripts are significantly different at P<0.05.

***DE (MJ/Kg DM) = digestible organic matter (DOM) X 19**

****ME (MJ/Kg DM) = DE x 0.82.**

The best CF digestibility (62.5 %) was that of ration 3 (alfalfa) followed by rations 1 and 2 (52.42 and 50.25 %) which were nearly similar (rice straw and acacia, respectively). This may be due to the high fiber content of alfalfa and /or the effect of concentrate: roughage ratio (48 : 52) followed by diet 2, 1 and 4 being, 56:44, 79:21 and 100:0.00, respectively. In contrast, the CF digestibility was lower in ration 4 than the other rations, which may be due to increasing of concentrats and decreased CF in such ration (3.54%). These results agree well with thoses reported by Taie (1998) who found improved CF digestibility with diets high in fiber content with sheep. Etman and Soliman (1999) also found that CF digestibility was increased with decreasing of concentrate feed mixture and increasing roughage and also found the digestibility coefficients of all nutrients were affected by concentrate : roughage ratios.

The adverse effect of acacia on the digestibility of the ration should be ascribed to the inhibitory effect of its high tannin content on microbial activity (Mcleod, 1974 and Malechek and Provenza, 1981). It seems that the protein in acacia is poorly digested by sheep and goats owing to the presence of tannins (4- 11 % DM basis; Degen *et al.*, 1995 and Abou- El Nasr *et al.*, 1996) and the fiber- bound N in acacia leaves, which average about 20% of the total nitrogen in *Acacia cyanophylla* (Ben Salem *et al.*, 1995). Kibon and Maina (1993) found that both intake and growth rate were reduced as the

level of *Acacia sieberiana* was increased beyond 45% of the supplement, because the toxic effects of the phenolic compounds present in acacia. However, they reported that acacia was able to support growth rates equal to or better than those obtained when feeding maize offal to lambs and concluded that acacia was an attractive low cost alternative supplementary feed during the dry season in Nigeria. Nantoume *et al.* (2001) fed male Angora goats (23.7 kg initial weight) air- dried acacia leaves and alfalfa hay which were chopped and mixed to prepare four diets containing 0, 25, 50 and 75 % of acacia leaves. They found that the digestibility of all the nutrients decreased ($P<0.05$) with increasing level of acacia. Although Shataewi *et al.* (2001) found that fresh acacia caused copper dificiency under the semi- arid condition prevailing in North Sinai, they found that Damascus does fed 0.6 kg/ head/ day of concentrate diet plus *ad lib.* green acacia produced 65 % more milk than those fed the same concentrate diet plus *ad lib.* rice straw. Mousa and Shetaewi (2002) found that ewes fed on 60% of their requirement from concentrate feed mixture plus *ad lib.* green acacia produced more milk yield than control ewes.

The previous effects on the digestion coefficients of the various nutrients were reflected on the feeding values of the consumed four rations (Table 2). Diet 4 had the highest ($P< 0.05$) TDN value, followed by diet 3 then diet 1. The lowest TDN value was that of diet 2. The superiority of diet 4 in TDN is mainly due to its ingredients which are known to be of high energy value such as maize and soybean meal which have high NFE content of high digestibility. These results are in agreement with those reported by Etman et al, (1998b) and Etman and Soliman (1999). It was also clear that diet 3 had better TDN than diets 2 and 1 although they contained almost equal amounts of CFM. This is therefore dependent on the type of roughage included in these three rations, being alfalfa (ration 3), rice straw (ration 1) and acacia (ration 2). Abou-Raya *et al.*, (1987) found that forage type has marked effects on the concenrates digestibility. In addition, Hanafy *et al.*, (1998) found that digestion coefficients of all nutrients were higher for darawa rations than berseem rations.

Regarding the DCP % of the four experimental rations (Table 2), it was clear that the differences among the four rations were significant ($P< 0.05$). The highest value was that of ration 3, simply because its higher CP content due to the inclusion of alfalfa and comparatively higher CP digestibility. The lowest was that of ration 1 which included rice straw. The low DCP value of ration 2 may be due to that acacia forage containes a high value of tannins, therefore it showed the lowest value of CP digestibility also, acacia had low CP content compared with alfalfa (Table 1). These results agreed with those obtained by Mohamed (1996) and Abou- El Nasr et al (1996). In addition, acacia leaves contains in average 20 % of its total N bound to fiber (N-ADF) as reported by Ben Salem *et al* (1995).

Nintrogen balance:

The data of N balance recorded for the four experimental rations are presented in Table 3.

In general, all animals were in positive N balance on the four experimental rations. The highest N intake was recorded for diet 3 containing alfalfa, followed by accacia group (2) and the least was naturally from the all concentrate diet (4). The amounts excreted in the feces are reflections of the CP digestibility coefficients. Fecal N was highest with diet 2 including acacia compared with diets 1, 3 and 4. These results agreed with those obtained by Woodward and Reed (1997) who found that fecal N was highest with diets including *Acacia brevispica* due to high levels of fecal neutral- detergent insoluble N.

Table 3. Nitrogen balance of kids fed the experimental ration.

Items	Experimental ration				
	1	2	3	4	± SE
No. of animals	4	4	4	4	
N- intake (g/h/d)	20.20^{c}	33.79^{b}	45.52^{a}	18.5^{c}	2.35
Fecal-N (g/h/d)	8.84^{c}	19.58^{a}	14.17^{b}	4.36^{d}	1.33
N- digested (g/h/d)	11.36^{d}	14.21^{b}	31.35^{a}	14.14^{b}	1.21
Urinary- N (g/h/d)	6.45^{b}	5.19^{b}	19.72^{a}	3.61^{b}	1.24
N- balance (g/h/d)	4.91^{d}	9.02^{c}	11.63^{a}	10.53^{b}	0.26
N- retained as % of					
N-intake	24.31^{b}	26.69^{b}	25.55^{b}	56.92^{a}	1.83
N- digested	43.22^{c}	63.47^{b}	37.10^{c}	74.47^{a}	2.60
N- retained/100 g TDNI	.65^{c}	1.22^{b}	1.06^{b}	1.68^{a}	0.067

a-d Means in the same row with different superscripts are significantly different at P<0.05.

The amounts excreted in the urine were the highest with ration 3 which received the highest N intake. The best utilized absorbed N was from ration 4 since it consumed the least amount and received the highest energy and it is known that N utilization is dependent on energy availability.

Sotohy *et al* (1997) reported that absorbed and retained nitrogen (g/day) were decreased with increasing levels of *Acacia nilotic* (tannin- rich plants) by baladi goats in Assiut.

Growth performance:

It is clear from Table (4) and Fig.1. that kids of group 4 reached marketing weight much faster (95 days) than the other three groups (190 days). This was a reflection of their almost two fold daily gains (170 g) compared to 88, 91 and 98 g for groups 1,2 and 3, respectively with no significant differences among them. These finding were in good agreement with those reported by Koumas and Economides (1987) who observed 232 – 274 g daily gains for fattening kids offered concentrate *ad lib*. In Cyprus, Hadjipanayiotou (1988) showed that postweaning growth rate of male Damascus kids offered concentrates (18% CP) *ad lib*itum along with 100 g of alfalfa hay per head daily was 275- 318 g/h/d. Naude and Hofmeyr (1981) in South Africa, Treacher *et al.* (1987) in The Untied Kingdom and Hadjipanayiotou (1988) in Cyprus showed that goats have greater growth potential when given concentrated feeds.

In Egypt, Mousa (1996) found that postweaning growth rate of male and female Egyptian Nubian kids offered 120% from the recommended NRC

(1981) allowances grew 17.8% faster (P<0.05) than those offered 100% NRC.

These rates of gain for kids of G4 are similar to those recoreded by Shehata (1997) who found that daily gain for kids in Matrouh and South Sinai were 190 and 192 g/h/d under the same fattening system for local lambs. Also, Shalaby (2000) found that this system of fattening for Barki lambs resulted in higher daily weight gain (223 g) compared with those maintained on the traditional feeding system on alfalfa hay plus wheat. Under Sinai conditions, Mousa (2001) found an average daily weight gain of 197 g for lambs fed on the same system of fattening which was 16.4% higher than those fattened on 70% of their TDN requirements as concentrated feed mixture plus 30% of requirements as olive pulp. Abou-Basha (1980) tested three rations with different concentrate percentage (20, 40 and 80%) and found that daily growth rates were 110, 145 and 178 g, respectively.

Table(4): Growth performance of Damascus kids fed the experimental rations.

Items	Experimental rations			
	1	2	3	4
No. of animal	6	6	6	6
Duration to marketing weight (days)	190	190	190	95
Intial live body weight (kg)	13.08 ±0.95	13.0 ±0.95	12.75 ±0.95	12.9 ±0.95
Final live body weight (kg)	29.86 ±1.11	30.33 ±1.11	31.41 ±1.11	29.04 ±1.11
Daily gain (g)	88.31 ±6.08^{b}	91.21 ±6.06^{b}	98.23 ±6.06^{b}	170 ± 5.25^{a}
Avg. daily DM intake (g) from:				
Concentrate	767	633	654	710
Roughage	180	369	346	-
Total	947	1002	1000	710
Avg. daily DM intake per:				
100 kg LBW	4.41	4.63	4.53	3.39
Kg $W^{0.75}$ (g)	95.0	101.8	98.2	72.5
Roughage : concentrate ratio	19 : 81	37 : 63	35 : 65	- : 100
Feed conversion (Kg feed/kg gain)	10.72	10.98	10.18	4.28
Feed cost/ Kg gain (LE)*	5.74	4.49	4.29	2.92

a, b means the same row with different superscripts, differ significantly (P<0.05).
***Calculated based on the price of one kg of ration 1, 2, 3 and 4 were 0.480, 0.390, 0.379 and 0.621 (LE), respectively.**
***Acacia and alfalfa are present in the farm without prices.**

Very high efficiency of feed utilization by animals fed high energy feeds was previously reported for lambs (Shehata, 1997; Shalaby, 2000 and Mousa, 2001) and kids (Contantinou, 1981; Koumas and Economides, 1987; Hadjipanayiotou, 1988; Mousa, 1996 and Shehata, 1997) which support the present results. However further investigations are required to fully explain the metabolic reasons, since the present knowledge that propionic acid is more efficiently utilized than acetic or butyric can not fully explain such large differences in feed utilization.

Although daily weight gain for kids and lambs fattened on all energy rich concentrate system (G4) was higher than kids fed on concentrate feed

mixture plus alfalfa or green acacia, the energy rich ingredients (mainly cereals) are not available of the nomadic people in Sinai, especially middle Sinai, since they are transported to Sinai from the Nile valley at high costs compared with acacia plants which grow all year round in Sinai and are considered as a good feed source for livestock (goats, sheep and camels) especially during the dry season. Animal production in Semi- arid in Sinai is based on feeding system using locally available forages and by- products. Also, alfalfa is one of the promising forage crops to be cultivated in newly reclaimed lands in Sinai for its high nutritive value and its ability to increase soil fertility. Utilization of non- conventional feed ingredients is becoming necessary to overcome the lack of feed resource in Sinai especial during the dry season.

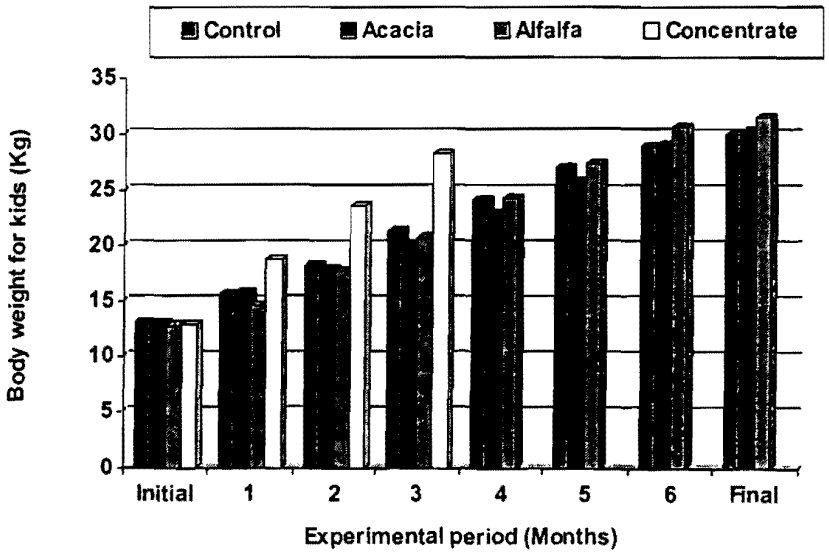

Figure 1. Change in body weight of kids during the experimental period.

Results showed that the greatest daily DM intake was observed with kids fed rations 2 followed by kids fed ration 3, 1 (control) and the least by kids fed ration 4 despite they gained the most daily gains. This was reflected on better feed conversion as DM or TDN intakes/Kg gain and as TDN intake/ Kg gain compared with kids fed rations 1, 2 and 3 which were nearly similar. In general feed conversion improved by increasing concentrate ratio. This result is in agreement with those reported by Abou-Basha (1980) and Shehata (1997).

Data revealed that ration 1 (as control) was of the highest feed cost to give kg gain (5.75 L.E.) followed by ration 2 (4.49 L.E.) and ration 3 (4.29 L.E.) while ration 4 was the lowest feed cost to give on kg gain (2.84).

Although ration 4 (*ad lib.* concentrates) can be used (feed mixture) in fattening growing kids from weaning till marketing weight which gave

economically higher daily gain yet the ingredients are not available in Sinai. However, feeding high energy diets containing mainly starch was shown to alter fermentation in the rumen towards high proportions of propionate leading to produce branched chin fatty acids of low melting point in the body (Garton *et al.*, 1972) which result in forming undesirable soft carcass fat. On the other hand, acacia and alfalfa are highly recommended to be used as non- conventional diet for kids under Semi- arid condition in Sinai. Utilization of non conventional feed ingrendients is becoming necessary to covercome the lack of feed resources in the Sinai during the dry seasons.

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J. Agric. Sci. Mansoura Univ., 28(7),July, 2003

تأثير نظام التغذية على كفاءة النمو والهضم للجداء الدمشقي تحت ظروف المناطق شبه القاحلة في شمال سيناء.

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أجريت هذه الدراسة في محطة تجارب قسم الأنتاج الحيواني - كلية العلوم الزراعية البيئية بالعريش- جامعة قناة السويس. حيث تم تقسيم ٢٤ جداء دمشقي بعد الفطام متوسط أوزانهم ١٣ كجم إلى ٤ مجموعات ، كل مجموعة تشمل ٦ جداء (٣ ذكور + ٣ إناث). غذيت المجموعة الأولى (كنترول) حسب إحتياجاتها وفقاً لمقررات NRC (١٩٨١) من العلف المركز وقش الأرز ، بينما غذيت المجموعة الثانية والثالثة على ٧٠% من إحتياجاتها من العلف المصنع وأعطيت الأكاسيا الخضراء والبرسيم الحجازي بحرية لتغطية بقية إحتياجاتها. أما المجموعة الرابعة فكانت تتغذى على مخلوط مركز يتكون من ٨٣% أذرة صفراء ، ١٥% كسب فول صويا ، ١,٤% حجر جيري ، ٠,٥% ملح طعام ، ٠,١% مخلوط فيتامينات وأملاح معدنية .

كانت معاملات هضم جميع العناصر الغذائية - بإستثناء الألياف الخام - أعلي معنوياً في مجموعة الجداء المغذاة علي العليقة الرابعة عن بقية المجموعات يليها المجموعات ٣ ، ١ ، ٢ علي التوالي.

تفوقت المجموعة الرابعة معنوياً في متوسط الزيادة اليومية ووصلت إلي وزن التسويق (٣٠ كجم) في فترة زمنية أسرع (نصف المدة) عن بقية المجموعات الثلاث الأخري وكانت الإختلافات غير معنوية بين الثلاثة مجاميع الأخري إبتداءً من الوزن الإبتدائي حتي وزن التسويق .

الكفاءة التحويلية للغذاء (كجم من الغذاء / كجم زيادة في الوزن) كانت أحسن في المجموعة الرابعة عن بقية المجاميع ، ولكنها كانت متقاربة تقريباً في الثلاثة مجاميع الأخري .

تكلفة العلف / كجم زيادة في الوزن الحي كانت اقل في المجموعة الرابعة عن بقية المجاميع ولكن هذه المواد المركزة غير متوافرة بسيناء لإنها تنقل من وادي النيل الي سيناء مما يعمل علي رفع أثمانها . بينما الأكاسيا تنمو طبيعياً طوال العام في سيناء ، وكذلك البرسيم الحجازي من المحاصيل العلفية الواعدة التي تنمو في المناطق الجديدة من المناطق الصحراوية .

كما أظهرت نتائج هذه الدراسة امكانية استخدام الأكاسيا الخضراء والبرسيم الحجازي بدلا من قش الأرز مع مخلوط العلف لتسمين الجداء تحت ظروف سيناء .