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EFFECT OF USING SUMMER GREEN FORAGE MIXTURE ON FATTENING FRIESIAN CALVES.

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ABSTRACT

Forty eight Friesian calves averaged 234.4±1.23 kg live body weight were assigned to investigate the effect of using sorghum or alfalfa alone or/and intercropped legume-grasses mixtures in daily rations of growing Frisian calves on nutrient digestibility , nutritive values , some blood parameters , daily gain and feed conversion. Friesian calves were divided into four similar experimental groups according to body weight. The experiment included two stages. The first stage represented a growing period (140 days), during which the calves were fed on the following rations: 1- The control group was fed 60% concentrate feed mixture + 40% rice straw. 2- The first tested group was fed 30% concentrate feed mixture + 60% Alfalfa + 10% rice straw. 3- The second tested group was fed 30% concentrate feed mixture + 60% sorghum + 10% rice straw. 4- The third tested group was fed 30% concentrate feed mixture + 30% Alfalfa + 30% sorghum + 10% rice straw. During the second stage (the finishing period,80 days) the corresponding calves were fed 60% concentrate feed mixture (CFM) + 40%rice straw for all experimental groups. Results showed that the digestibility of DM, OM and CF of R1 (control ration), R2 (contained 60 % alfalfa) and R4 (contained 30% alfalfa plus 30% sorghum forage) were significantly (P<0.05) higher than those of R3 (contained 60% sorghum forage). While the nutritive values as TDN% and DCP% were significantly higher (P<0.05) for R1 (control ration) than those of R2 (contained 60 % alfalfa), R3 (contained 60% sorghum forage) and R4 (contained 30% alfalfa plus 30% sorghum forage). The average daily feed intake by calves fed alfalfa (R2) during growing period were higher than those fed R1 (control ration) , R3 (contained sorghum forage) and R4 (contained alfalfa plus sorghum forage). Average daily feed intakes during the finishing period showed that calves fed R1 (control ration) and R4 had the highest DM intake. However those fed ration R2 (control ration) showed the lowest intake of DM intake. Final body weight , total and daily body weight gain of calves fed R1 (control ration) were375.42,141.67 and 1.01 kg ,respectively during growing period, showing significantly higher (P<0.05) than other different ration , but final body weight , total and daily body weight gain of calves fed R3 (contained sorghum forage) recorded 342.42,105.42 and 0.75 kg , respectively. It were significantly lower (P<0.05) than other different rations. While final body weight, total and daily body weight of calves fed R4 (contained alfalfa plus sorghum forage) were significantly (P<0.05) higher than R2 (contained alfalfa) and R3 (contained sorghum forage). The best feed conversion was attained for the group feed R1 (control ration) 8.61, 5.68 and 0.96 for DM, TDN and DCP, respectively followed by group fed R4 (contained alfalfa plus sorghum forage) being, 13.56, 8.95 and 1.50 for DM, TDN and DCP, respectively during growing period. It could be concluded that the alfalfa–sorghum mixture was better than alfalfa or sorghum as green forage in growing calves feeding in the summer season which lead to improve digestibility of most nutrients, increase daily gain and feed conversion .Moreover, using sorghum grass tended to give better daily gain and higher economical return during the whole fattening period.

Keywords: Friesian calves, alfalfa forage, sorghum forage, digestibility, blood, daily gain, feed conversion.

INTRODUCTION

Newly reclaimed lands are potential areas for fodder production, which can help in reducing the shortage of animal feeds. (Gabra *et al*., 1993). The shortage in feed resources is also unevenly divided between summer and winter. During winter season, Egyptian clover (berseem), the major forage crop in Egypt, covers 60 and 75% of annual animal requirements from energy and protein, respectively (Abou-Raya, 1967, El-Shazly, 1983, Abou-Akkada *et al*., 1984 and Hathout, 1987). However, during summer season , the available feed (mainly concentrate and straw) covers only about 39% and 22% of animal requirements from energy and protein, respectively (EL-Serafy ,1991). So, increasing production of summer forages is urgent to meet livestock needs. In Egypt, animals are suffering from shortage of feeds especially during summer season which is to be reflected on animal production. Most of animals feeding in this period depend on grains, concentrate mixture and agricultural residues. The expensive price of grains led to increase feed cost of animals. Several attempts were undertaken in Egypt to increase and improve animal feeds as a partial solution for their acute shortage during summer period (Ghoneim, 1964, Abou-Raya *et al.,* 1965, Ibrahim *et al.,* 1980, 1982 and 1983, Shalaby *et al*., 1985 and Allam *et al.*, 1980. Green forages can play an important role to cover this shortage. They are cheap feed for ruminant nutrition especially milk production. Moreover they improve animal health and reduce health expenses. The most green forages in summer season are grasses such as sorghum which contains low protein content. So, it needs supplementary protein source as concentrates or legume forages such as alfalfa .High yielding and quality legume-grass mixtures play an important part in forage animal system Mooso and Wedin,(1990). On the other side, practical studies were carried out to utilize some mixture of legumes and grasses in ruminant feeding such as cowpea with sorghum (Gabra *et al.,* 1991). Their work on intercropping legumes with grasses were encouraging and callined for further investigations on legume grasses mixture to participate in solving the critical problem for feed shortage in summer season. In addition to the various benefits of mixing legume with several grasses. Alfalfa, the forage crop relatively high in CP content, is one of the main crops cultivated in newly reclaimed soils and it has great role in increasing soil fertility through nitrogen fixation. On the other hand, sorghum low in protein content. Intercropping leguminous forage on grasses could give good chance to maintain a continuous supply of green forages throughout summer season as well as balance diet (Moursi *et al*., 1977, Shalaby *et al*., 1985, Gabra and Ghobrial 1992 and Ibrahim, 1992).Intercropping forages improved herbage productivity and quality and it could help in reducing costs of the animal production system.(Murphy *et al.,* 1995).

The objective of this experiment was to investigate the effect of using sorghum or alfalfa alone or/and intercropped legume-grasses mixtures in rations formulation of growing Frisian calves on their productive performance, and, economical efficiency.

MATERIALS AND METHODS

The present study was conducted at Dina Farm (Cairo-Alexandria desert road). Forty eight Friesian male calves about 234.42 kg live body weight were randomly chosen and divided into four similar groups (12 calves for each) according to their body weight. The experiment included two stages, first stage was represented as growing period (140 days), during which the calves of the four groups were assigned at random to receive one of the following four experimental rations: 1- The control group was fed 60% concentrate feed mixture + 40% Rice straw. 2- The first tested group was fed 30% concentrate feed mixture + 60% Alfalfa + 10% rice straw. 3- The second tested group was fed 30% concentrate feed mixture + 60% sorghum + 10% rice straw. 4- The third tested group was fed 30% concentrate feed mixture + 30% Alfalfa + 30% sorghum + 10% rice straw. During the second stage, (finishing period, 80 days) the corresponding calves were fed 60% concentrate feed mixture (CFM) + 40%rice straw for all experimental groups. The animals of each treatment were group fed ad-libtumn. Rations were offered twice daily at 8 a.m. and 4 p.m. and water was offered freely. The chemical composition of ingredients and the experimental rations (DM basis %) are shown in Table (1).

Table (1): Chemical composition of the ingredients to formulate the experimental rations and their calculated composition.

Items	Composition on DM% basis						
	DM	OM	CP	EE	CF	NFE	Ash
*Concentrate feed mixture	91.75	91.02	16.59	2.80	12.06	59.57	8.98
Berseem alfalfa	24.30	90.40	18.11	2.25	23.99	46.05	9.60
Sorghum	23.5	88.36	12.00	1.37	26.17	48.82	11.64
Rice straw	91.99	80.77	3.37	0.89	34.00	42.51	19.23
Calculated experimental ration Growing period							
R1 (control) 60% CFM and 40% rice straw	91.85	86.92	11.30	20.84	2.04	52.74	13.08
R2 (30% CFM+ 60% Alfalfa +10% rice straw)	51.30	89.62	16.18	21.41	2.28	49.75	10.38
R3 (30% CFM+ 60% sorghum +10% rice straw)	50.82	88.40	12.51	22.72	1.75	51.42	11.60
R4 (30% CFM+ 30% sorghum +30% alfalfa +10% rice straw)	70.86	88.42	14.35	22.07	2.02	49.98	11.58
Finishing period							
60% CFM and 40% rice straw	91.85	86.92	11.30	20.84	2.04	52.74	13.08

***Concentrate feed mixture consists of : 25% yellow maize, 27% undecorticated cotton seed meal, 20% rice bran, 15% wheat bran, 5%soybean meal, 5% molasses, 2% limestone, 1% common salt.**

Live body weight changes and feed intake were recorded biweekly. Before starting the growing period, three calves from each group were randomly chosen to determine the nutrients digestibility of the four experimental rations using acid insoluble ash techniques (A.I.A.) according to Van Keulen and Young (1977). They were individually fed for a two weeks preliminary period followed by three days collection period. Proximate analyses of feedstuffs and faeces samples were carried out according to the methods of A.O.A.C (2000). Blood samples were taken before feeding from

the jugular vein from each animal of digestibility trail and allowed to flow into acid washed heparinzied tubes and were centrifuged at 3000 r.p.m. for 15 min. to separate plasma and stored at -20 ^{o}C until analysis .Total protein and albumin were determined according to Weichselboum (1946) and Drupt (1974) respectively. Urea concentration was determined according to Fawcett and Scott (1960).

Data were statistically analyzed by general linear, model using ANOVA procedures of SAS (1996). The significance among treatments means were tested using Duncan's multiple range tests, (Duncan) (1955).

RESULTS AND DISCUSSION

Nutrient digestibility and Nutritive values:

The digestion coefficients of DM, OM and CF of R1 (control ration), R2 (contained 60 % alfalfa) and R4 (contained 30% alfalfa plus 30% sorghum forage) were significantly (P<0.05) higher than those of R3 (contained 60% sorghum forage) as shown in Table 2 .Also, CP and NFE digestibility coefficient of R1 (control ration) were significantly (P<0.05) better than those of the others rations. The EE digestibility of R1 (control ration) and R2 (contained 60 % alfalfa) significantly (P<0.05) increased than that of R3 (contained 60% sorghum forage) and R4 (contained 30% alfalfa plus 30% sorghum forage). Data presented in table (2) showed also that ration containing both alfalfa and sorghum (R4) had insignificant higher digestibility coefficients for DM, OM, CF and NFE than those of containing either alfalfa or sorghum alone. Also, it could be noticed that ration containing alfalfa (R2) had significantly (P<0.05) higher DM, OM, EE, CF digestibility coefficients than that containing sorghum (R3). Generally, control ration (R1) was of higher digestibility coefficients for most of nutrients owing to its higher concentrate feed mixture content than other rations. The present results are in agreement with those reported by Gabra and Ghobrial, (1992) who found increases in the digestibility coefficients and nutritive values of alfalfa, being 63.90, 71.60, 63.20, 62.90, 75.90, 62.60 and 11.60 for DM, CP, EE, CF, NFE, TDN respectively with sheep. Bowman and Asplund , (1988) found that the adition of lucerne to sheep ration improved sheep performance which may due to an increased the nitrogen available for use by rumen microbes for growth and protein synthesis . Abdel-Hamid *et al.,* (2008) indicated that digestion coefficients of DM,OM,EE and NFE for in the 1st cut *Sesbania–Sudan* grass mixture were significantly higher than those for Cowpea-Millet mixture and Cow pea-Millet x Napier grass hybrid mixture by growing lambs. Aboul-Foutouh *et al*. (1999) found that the sweet sorghum diet had lower OM digestibility than other treated diets , and CP digestibility of T1 (contained 40% concentrate plus 60% sweet sorghum) significantly (P<0.05) decreased than that of T5 (contained 40% concentrated plus 60% sorghum SV-10017) by Egyptian lactating buffaloes . EL-Garhy and Abdel –Azeem (2003) showed that Sweet sorghum had the lowest digestibility coefficients compared to the other tested forage hay by lactating buffaloes. The digestibility coefficients were in the ranges reported by different workes (Chauhan and Randhawa , 1983 ; Aboul-Fotouh, 1993 ; Abdel-Baki *et al.,* (1997 and 1999). Abdel

Rahman *et at.,* (2001) showed that intercropping (Berseem and Raygrass) remarkably increased DM , EE, CF and NFE compared to Berseem of Ossimi lambs. Ibrahim *et al.,* (2008b) found that digestion coefficients of nutrients of Napier grass x Millet hybrid were higher than Napier grass or Millet also especially in 2nd cut by mature farafra rams. Ibrahim *et al.,* (2008b) found that digestion coefficients of DM, OM, CP and EE with *Sesbania-Sudangrass* mixture were significantly (P<0.05) higher than those found in *Cawpea–Millet* mixture by lactating Zaraibi Goats.

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

Items		Experimental rations			SE
	R1	R2	R3	R4	±
Digestibility coefficients %					
DM	69.92[a]	68.89[a]	62.49[b]	69.64[a]	0.731
OM	72.44[a]	70.30[a]	65.36[b]	71.85[a]	0.771
CP	73.70[a]	67.84[b]	66.43[b]	67.27[b]	1.33
EE	73.01[a]	71.25[a]	66.89[b]	68.02[b]	0.959
CF	67.63[a]	68.51[a]	62.12[b]	68.81[a]	0.951
NFE	70.81[a]	67.85[b]	67.45[b]	68.62[ab]	0.852
Nutritive value %					
TDN	65.98[a]	62.75[bc]	61.97[c]	63.64[b]	0.413
DCP	8.33[c]	10.98[a]	8.31[c]	9.65[b]	0.193

a, b and c : Means followed by different letters in the same row are significantly different (P<0.05)

On the other hand, the nutritive values as TDN% (table 2) were significantly higher (P<0.05) for R1 (control ration) than those of R2 (contained 60 % alfalfa), R3 (contained 60% sorghum forage) and R4 (contained 30% alfalfa plus 30% sorghum forage) reflecting the same trend found with nutrients digestibility. The differences among the tested rations regarding digestibilities and feeding values may reflect the type of forage as observed in intercropping alfalfa and sorghum forages .While nutritive value as DCP% was significantly higher (P<0.05) for R2 (contained 60 % alfalfa) than those of the other three diets. This was mainly due that the CP% of this ration was the highest (16.18%) as shown in table (1) .The present results are in agreement with those reported by Soliman *et al.,* (1997) who found that TDN and DCP of the ration contained *Sesbania-Teosinte* mixture were higher than that contained *Teosinte* by growing lambs. Ibrahim *et al.,* (2008a*)* found that DCP of Napier grass x Millet hybrid was higher than Napier grass or Millet. Aboul-Fotouh *et al.,* (1999) found that the feeding values as TDN and DCP were significantly higher (P<0.05) of ration containing sorghum forage than those of the control diet.

Blood parameters:

Values of some blood parameters (Table 3) indicated that there were no significant differences among all experimental rations for total protein , albumin and globulin , while plasma urea-N of R1(control ration) , R2(contained 60 % alfalfa) and R4 (contained 30% alfalfa plus 30% sorghum forage) were significantly (P<0.05) higher than R3. The higher value of plasma urea-N for previous rations may be due to higher level of ammonia- N

in the rumen. However, all animals in different rations were healthy. The obtained values of this study were within the normal range reported by Jain (1986) and Kaneko(1989) for healthy goats and in line with the findings of Gaber *et al.,* (1999) , Ibrahim *et al.,* (2008b) and Ahmed *et al.,* (2001) for the blood of healthy goats .

Table (3): Some blood parameters of Friesian calves fed experimental rations.

Items	Experimental rations				SE ±
	R1	R2	R3	R4	
Total protein g/dl	8.98[a]	9.62[a]	8.93[a]	8.85[a]	0.232
Albumen g/dl	4.03[a]	4.26[a]	3.93[a]	4.12[a]	0.368
Globulin g/dl	4.96[a]	5.35[a]	5.00[a]	4.73[a]	0.451
Urea-N mg/dl	28.36[a]	26.72[b]	21.82[c]	26.97[b]	1.85

a, b and c : Means followed by different letters in the same row are significantly different (P<0.05)

Growth performance

Results in table (4) showed that the average daily DM, TDN and DCP intakes (kg/h) by calves fed alfalfa (R2) during growing period were higher than those fed R1 (control ration), R3 (contained sorghum forage) and R4 (contained alfalfa plus sorghum forage).. Total and daily body weight gain of calves fed R1 (control ration) during growing period were significantly (P<0.05) higher than those fed the others, but total and daily body weight gain of calves fed R3 (contained sorghum forage) showed the opposite trend. Moreover, animals fed (R4) containing alfalfa plus sorghum have significant (P<0.05) higher both daily and total gains than those fed either alfalfa or sorghum alone.

Table (4): Average daily gain, feed intake, and feed utilization efficiency by Friesian calves fed experimental rations during growing period.

Items	Experimental rations				SE ±
	R1	R2	R3	R4	
Growing period					
No. of Animal	12	12	12	12	-
Duration , days	140	140	140	140	-
Initial weight , kg	233.75[ab]	232.67[b]	237.0[a]	234.25[ab]	1.21
Final weight , kg	375.42[a]	347.92[c]	342.42[d]	360.83[b]	0.61
Total gain, kg	141.67[a]	115.25[c]	105.42[d]	126.58[b]	0.79
Av. Daily gain, kg /head/day	1.01[a]	0.82[c]	0.75[d]	0.90[b]	0.007
Concentrate DM,kg/head/day	6.09	5.81	5.79	5.95	-
Rice straw DM,kg/head/day	2.62	2.62	2.62	2.62	-
Alfalfa DM,kg/head/day	**-**	**4.24**	**-**	**2.09**	**-**
Sorghum DM,kg/head/day	**-**	**-**	**3.21**	**1.60**	**-**
Total DM intake , kg/head/day	**8.71**	**12.67**	**11.63**	**12.26**	**-**
Total TDN,kg /head/day	**5.75**	**8.36**	**7.67**	**8.09**	**-**
Total DCP,kg/head/day	**0.97**	**1.41**	**1.29**	**1.36**	**-**
Feed conversion					
Kg DM/kg,gain	**8.61[c]**	**15.39[a]**	**15.44[a]**	**13.56[b]**	**0.102**
Kg TDN/kg,gain	**5.68[c]**	**10.15[a]**	**10.19[a]**	**8.95[b]**	**0.061**
Kg DCP/kg,gain	**0.96[c]**	**1.71[a]**	**1.71[a]**	**1.50[b]**	**0.02**

a, b and c : Means followed by different letters in the same row are significantly different (P<0.05

With regard to feed conversion , it could be noticed that animals fed R1(control ration) was the best group to convert feed intake to gain , being 8.61, 5.68 and 0.96 kg DM, TDN and DCP per kg gains, respectively, during the growing period, as shown in (table 4). Results obtained might be due to the lowest feed intake recorded with animals fed R1 which gave the highest total and daily gain

Results in table (5) showed that the average daily feed intakes during the finishing period showed that calves fed R1 (control ration) and R4 had the highest DM intake. However, calves fed R3 during finishing period revealed compensatory growth after feeding on sorghum forage during the growing period. The final body weight, total and daily body weight gains of calves fed R3 during finishing period were significantly higher (P<0.05) than those fed other rations. Feed conversion expressed as kg TDN per kg gain of calves fed R1 (control ration) were the lowest efficient compared with those fed the other rations during the finishing period. While calves fed R3 were the best efficient during finishing period showing 5.39, 3.34 and 0.45 kg DM, TDN and DCP per kg gain , respectively . Results in table (5) revealed that animals fed R3 containing sorghum attained the best feed conversion, which might be due to that this group gave the highest daily gain with the lowest TDN and DCP intake.

Table (5): Average daily gain, feed intake, and feed utilization efficiency by Friesian calves fed experimental rations during finishing period.

Items	Experimental rations				SE
	R1	R2	R3	R4	±
Finishing period					
No. of Animal	12	12	12	12	-
Duration , days	80	80	80	80	-
Initial weight , kg	375.42^{a}	347.92^{c}	342.42^{d}	360.83^{b}	1.66
Final weight , kg	473.33^{c}	468.17^{c}	504.58^{a}	492.92^{b}	2.78
Total gain, kg	92.92^{c}	120.25^{bc}	162.16^{a}	132.09^{b}	1.98
Av. Daily gain, kg /head/day	1.22^{c}	1.50^{b}	2.03^{a}	1.65^{b}	0.44
Concentrate DM,kg/head/day	7.43	7.11	7.29	7.36	-
Ric straw DM,kg/head/day	3.72	3.57	3.65	3.68	-
Total DM intake , kg/head/day	11.15	10.68	10.94	11.04	-
Total TDN intake , kg/head/day	7.36	6.70	6.78	7.03	
Total DCP intake , kg/head/day	0.93	1.17	0.91	1.07	
Feed conversion					
Kg DM/kg,gain	6.14^{a}	7.12^{b}	5.39^{c}	6.69^{b}	0.28
Kg TDN/kg,gain	6.03^{a}	4.47^{b}	3.34^{c}	4.26^{b}	0.033
Kg DCP/kg,gain	0.76^{a}	0.78^{a}	0.45^{b}	0.65^{b}	0.001

a, b and c : Means followed by different letters in the same row are significantly different (P<0.05

Results in table (6) showed that the average daily feed intakes during the whole period showed that calves fed R2 and R4 had the highest DM , and those fed ration R1 (control ration) showed the lowest intake of DM intake. Total and daily body weight gains of calves fed R3 during whole period were significantly higher (P<0.05) than those fed other rations. Results obtained in table (6) revealed that total and average daily gains were the

highest values with animals fed (R3) containing sorghum forage, being 267.58 and 1.22kg, respectively. Animals fed (R4) containing mixture from alfalfa and sorghum attained more daily gain than those fed alfalfa alone or control ration. Data showed also that animals fed R1 (control ration) tended to the best in feed conversion , recording 8.89 , 5.86 and 0.74 kg DM, TDN and DCP per kg gain, respectively . Generally animals fed rations containing forage either alfalfa or sorghum appeared to lower feed conversion than those fed control ration. The present results are in agreement with those reported by Soliman *et al.,* (1997) and Abdel-Rahman *et al.,* (2001) who found that growth performance and feed conversion of legume –grass mixture was better than legumes or grasses alone. Etman (1980) showed that Napier grass is palatable forage when fed to buffalo steers and cows either alone or with limited amounts of concentrates. The average of daily DM consumption per l00 kg of live weight was 2.38 kg. Murphy, *et al.,* (1994) found that the average daily gain was greater for lambs fed 100% concentrate compared with lambs grazed alfalfa or rye grass

Table (6): Average daily gain, feed intake, and feed utilization efficiency by Friesian calves fed experimental rations during whole period.

Items	Experimental rations				SE ±
	R1	R2	R3	R4	
Whole period					
No. of Animal	12	12	12	12	-
Duration , days	220	220	220	220	-
Initial weight , kg	233.75^{ab}	232.67^{b}	237.0^{a}	234.25^{ab}	0.99
Final weight , kg	473.33^{b}	468.17^{b}	504.58^{a}	492.92^{a}	5.62
Total gain, kg	239.58^{c}	235.50^{c}	267.58^{a}	258.58^{b}	1.43
Av. Daily gain, kg /head/day	1.09^{b}	1.07^{b}	1.22^{a}	1.18^{a}	0.013
Concentrate DM,kg/head/day	7.07	7.01	7.42	7.27	-
Ric straw DM,kg/head/day	2.62	2.62	2.62	2.62	-
Alfalfa DM,kg/head/day	-	4.24	-	2.09	-
Sorghum DM,kg/head/day	-	-	3.21	1.60	-
Total DM intake , kg/head/day	9.69	13.87	13.25	13.58	-
Total TDN intake , kg/head/day	6.39	8.87	8.40	8.76	-
Total DCP intake , kg/head/day	0.81	1.39	1.10	1.25	-
Feed conversion					
Kg DM/kg,gain	8.89^{c}	12.96^{a}	10.86^{b}	11.51^{b}	0.330
Kg TDN/kg,gain	5.86^{c}	8.29^{a}	6.87^{b}	7.42^{b}	0.055
Kg DCP/kg,gain	0.74^{c}	1.30^{a}	0.90^{b}	1.06^{b}	0.018

a, b and c : Means followed by different letters in the same row are significantly different (P<0.05

Economic efficiency:

Data in table (7) clearly indicated that calves fed R1(control ration) followed R4(contained alfalfa plus sorghum forage) recorded the highest economic efficiency ++and those fed R2(contained alfalfa) recorded the lowest values during growing period . But calves fed R3 recorded the highest economic efficiency and those fed R1 recorded the lowest values during finishing period .while calves fed R1 during whole period recorded the highest economic efficiency, but those fed R3 recorded the lowest values .

Table (7): Economic efficiency with Friesian calves fed experimental rations during growing and finishing periods.

Items	Experimental rations			
	R1	R2	R3	R4
	Growing period			
Daily feed intake (as fed /kg)				
Concentrate DM,kg/head/day	6.64	6.33	6.31	6.49
Ric straw DM,kg/head/day	2.85	2.85	2.85	2.85
Alfalfa DM,kg/head/day	-	17.45	-	8.60
Sorghum DM,kg/head/day	-	-	13.66	6.85
Total daily feed cost L.E.	8.97	11.19	9.91	10.75
Average daily gain,kg	1.01	0.82	0.75	0.90
Feed cost /kg gain, L.E.	8.89	13.64	13.21	11.95
Price of daily gain,L.E.	15.15	12.30	11.25	13.50
Economical return L.E.	6.18	1.11	1.34	2.75
Economical efficiency	1.69	1.10	1.14	1.26
	Finishing period			
Daily feed intake (as fed /kg)				
Concentrate DM,kg/head/day	8.10	7.75	7.95	8.02
Ric straw DM,kg/head/day	4.04	3.88	3.97	4.00
Total daily feed cost L.E.	11.01	10.54	10.81	10.91
Average daily gain,kg	1.16	1.22	1.41	1.27
Feed cost /kg gain, L.E.	9.50	8.64	7.67	8.59
Price of daily gain,L.E.	17.40	18.30	21.15	19.05
Economical return L.E.	6.39	7.76	10.34	8.14
Economical efficiency	1.58	1.74	1.96	1.75
	Whole period			
Daily feed intake (as fed /kg)				
Concentrate DM,kg/head/day	7.71	7.64	8.09	7.92
Ric straw DM,kg/head/day	2.85	2.85	2.85	2.85
Alfalfa DM,kg/head/day	-	17.45	-	8.60
Sorghum DM,kg/head/day	-	-	13.66	6.81
Total daily feed cost L.E.	10.37	12.89	12.23	12.61
Average daily gain,kg	1.09	1.07	1.22	1.18
Feed cost /kg gain, L.E.	9.51	12.05	10.02	10.69
Price of daily gain,L.E.	16.35	16.05	18.30	17.70
Economical return L.E.	5.99	3.16	6.08	5.09
Economical efficiency	1.58	1.25	1.50	1.40

Calculation was based on the following price in Egyptian pound (L.E.) per ton at 2009, concentrate feed mixture (CFM)= 1300 L.E./ton, alfalfa forage=150 L.E./ton, sorghum forage =100 L.E./ton, Rice straw=120 L.E./ton, the price of one kg live body weight was 15 L.E .

Conclusion:

It could be concluded that the alfalfa–sorghum mixture was better than alfalfa or sorghum as green forage in growing period of calves fed during summer season which lead improve digestibility of most nutrients increasing average daily gain and feed conversion. Moreover, using sorghum grass tended to give better daily gain and higher economical return during the whole fattening period.

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تأثير استخدام المخاليط العلفية الخضراء الصيفية فى تسمين عجول الفريزيان.

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أجريت الدراسة بإستخدام 48 عجل فريزيان متوسط أوزانها الحى 234.4 كجم وذلك لدراسة تأثير استخدام الاعلاف الخضراء الصيفية مثل البرسيم الحجازى والسورجم او مخلوط منهم ا فى علائق العجول الفريزيان وتاثيرها على معاملات الهضم والقيمة الغذائية وبعض مقاييس الدم ومعدل النمو والكفاءة الاقتصادية . وقسمت الحيوانات الى أربعة مجاميع متماثلة فى كل مجموعة 12 عجل ، وغذيت المجاميع على النحو على مرحلتين:- المرحلة الاولى مرحلة النمو لمدة 140 يوم وكانت التغذية على النحو التالى : مجموعة الأولى (الكنترول) غذيت على عليقة مكونة من (60% علف مركز، 40% قش أرز) . والمجموعة الثانية غذيت على عليقة مكونة من (30% علف مركز ، 60% برسيم حجازى ، 10% قش ارز) والمجموعة الثالثة غذيت على عليقة مكونة من (30% علف مركز ، 60% سورجم ، 10% قش ارز) والمجموعة الرابعة غذيت على عليقة مكونة من (30% علف مركز ، 30% برسيم حجازى ، 30% سورجم ، 10% قش ارز) .

المرحلة الثانية مرحلة التسوية (لمدة 80 يوم) غذيت جميع الحيوانات على (60% علف مركز، 40% قش أرز) ومن النتائج التى تم الحصول عليها من هذه الدراسة أن معاملات الهضم لكل من المادة الجافة والعضوية والالياف الخام زادت زيادة معنوية للعجول التى غذيت على عليقة الكنترول والعلائق التى تحتوى على البرسيم الحجازى والسورجم وخليط منهم . كما زادت المركبات الكلية المهضومة والبروتين المهضوم للعجول المغذاة على عليقة الكنترول بالمقارنة بالمجاميع المغذاة على علائق تحتوى على اعلاف خضراء صيفية خلال فترة النمو. زيادة معدل النمو اليومى للعجول المغذاة على عليقة الكنترول مقارنة بالمجاميع المغذاة على علائق محتوية على اعلاف خضراء صيفية وهى 1.01، 0.82، 0.75، 0.90 لعلائق رقم 1، 2، 3، 4 على التوالى ، بينما وجد ان زيادة معدل النمو اليومى للعجول المغذاة على عليقة تحتوى على مخلوط من البرسيم الحجازى والسورجم مقارنة بالمجاميع التى غذيت على البرسيم الحجازى والسورجم منفرد وذلك خلال فترة النمو ، بينما خلال فترة التسوية وجد ان المجاميع التى سبق ان غذيت على السورجم كانت افضل من المجاميع الاخرى وذلك لحدوث النمو التعويضى عند التغذية على عليقة جافة تحتوى على كمية مرتفعة من العلف المركز يليها المجموعة التى سبق وان غذيت على عليقة تحتوى على مخلوط من البرسيم الحجازى والسورجم يليها المجموعة التى غذيت على البرسيم الحجازى منفرد. كان التحويل الغذائى للحيوانات المغذاة على عليقة كنترول افضل مقارنة بالمجاميع الاخرى، بينما كان التحويل الغذائى للمجموعة التى غذيت على مخلوط من البرسيم الحجازى والسورجم افضل مقارنة من المجاميع الاخرى التى غذيت على البرسيم الحجازى والسورجم منفردين خلال فترة النمو

ونستخلص من هذه الدراسة:

استخدام مخلوط من البرسيم والسورجم فى العلائق للعجول الفريزيان خلال فترة النمو كان افضل من استخدام البرسيم الحجازى والسورجم منفردين خلال موسم التغذية الصيفى والذى يؤدى الى تحسن معاملات الهضم للمركبات الغذائية ومتوسط النمو اليومى والكفاءة وكانت افضل العلائق اقتصاديا مقارنة بالعلائق الاخرى المختبرة .بينما المجموعة التى غذيت على السورجم خلال فترة النمو سجلت اعلى معدل للنمو اليومى والكفاءة التحويلية فى مرحلة التسوية بسبب النمو التعويضى الذى حدث للحيونات .

قام بتحكيم البحث

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