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EFFECT OF FEEDING LACTATING GOATS RATIONS CONTAINING SUGAR BEET TOPS (DRIED OR SILAGE) AND FODDER BEET ROOTS SILAGE ON THEIR PERFORMANCE.

Mohammed, Bahira K.
Animal Production Research Institute, Agric. Res. Center, Ministry of Agric., Giza, Egypt.

ABSTRACT

Twenty-eight zaraibi goats in the 3rd season of lactation with average body weight of 40 Kg were used in a feeding trial and divided randomly into four similar groups. All groups fed on restricted amount of concentrate feed mixture (CFM) (1Kg/h/day) along with clover hay (CH), fodder beet roots silage, (FBRS) sugar beet tops silage (SBTS) and dried sugar beet tops (DSBT) (*ad lib.*) in R_1 (control), R_2, R_3, R_4 , respectively. Twelve zaraibi buks with average body weight of 50 Kg were used in four digestion trials to evaluate the nutritive values of tested rations.

The results showed that DM intake expressed as Kg/h/day or g/Kg $w^{0.75}$ was not affected by dietary treatments. However the digestion coefficients obtained for all nutrients of the R_2 (containing FBRS), except that of DM were significantly higher ($P<0.01$) than those of the other rations. The highest feeding value, expressed as TDN and DCP, was recorded in R_2, while R_3 (containing SBTS) and R_4 (containing DSPT) were similar in TDN and DCP and recorded the lowest values, but R_1 (containing CH) fall intermediate.

Average daily 4% FCM of goats fed R_2 recorded the highest significant ($P<0.01$) value (0.994 Kg/day) while those fed R_4 showed the lowest ($P<0.01$) one (0.778 Kg/day), while R_1 and R_3 gave intermediate values (0.859, & 0.915 Kg/day) respectively.

Milk protein%, TS% and SNF% were not significantly affected by the tested rations. Fat% and av., protein yield were significantly higher ($P<0.01$) by goats fed R_2 or R_3 rations than those fed R_1 or R_4. Average lactose% was higher ($P<0.01$) with R_1, R_2 and R_4 than with R_3. Av., TS yield and SNF yield were higher ($P<0.01$) when goats fed R_2 or R_3 than when fed R_1 or R_4.

The goats fed R_2 and R_3 contained FBRS and SBTS, respectively, exhibited higher production efficiency values than those fed R_1 and R_4 contained CH and DSBT.

Economic efficiency of SBTS, FBRS and DSBT contained rations reflect superiority over the CH ration by about 32.2, 27.4 and 16.0% respectively.

It could be concluded that using FBRS and SBT as hay or silage for feeding lactating animals will help in solving the shortage of animal feeds problem during summer and reduce feed cost of Kg milk produced.

Keywords: Clover hay, Fodder beet roots silage, Sugar beet tops, Lactating goats, Milk yield and composition.

INTRODUCTION

Due to lake of fodder crops and concentrates for feeding farm animals in Egypt, nutritionists through about the nutritive values of crops by-products and possibility of using these by-products for feeding farm animals. One of these crops which gives very huge amount of by-products is sugar beet (SB). Large quantities of SB tops are produced as an agricultural by-product after harvesting the crop, about 1.46 million tons fresh sugar beet

tops (SBT) contained 144840 tons DM are produced every year (Ali *et al.*, 2000). Thus, the availability of using SBT for livestock feeding was investigated by many authors (Bendary *et al.*, 1992 a,b; Ali, 1996; Mohi El-Din, 1998 and Eweedah *et al.*, 1999). In this respect, the results of the metabolism trials on mature Friesian calves carried out by Bendary *et al.* (1992 a, b) indicated that SBT (fresh, dried or silage) had higher nutritive value and more palatable compared to the other roughage by-products.

Fodder beet roots (FBR) could be recommended as one of the highest producing forage in loamy and reclamation areas and it was found to be a good source of energy for animal feeding (Rammah *et al.*, 1984). So, drying or ensilage of SBT and FBR as a method for conservation may contribute in solving some of the problems concerning shortage in resources of animal feeds especially in the summer season and minimize the pollution caused by accumulation of such agriculture by-products.

The main objective of this study was to investigate the chemical composition, digestibility and nutritive values of SBT (either dried or ensiled) and ensiled FBR and the effect of feeding rations containing different forms of sugar beet tops and fodder beet roots silage on the performance of lactating goats.

MATERIALS AND METHODS

The present study was carried out at El-Serw Experimental Station, belonging to Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture, Egypt.

Twenty eight lactating zaraibi goats in the 3rd season of lactation aging about 36-48 months and weighing on average 40 Kg were divided randomly according to their live body weight and milk yield into four similar groups, (seven animals each). The experimental trial was started after 30 days post calving and continued for 112 days. All groups were fed on restricted amount of commercial concentrate feed mixture (CFM) to cover 50% of crude protein (CP) requirements recommended by NRC (1981) for lactating goats to produce one Kg of milk (4% fat). The other 50% of CP requirement was provided from four tested ingredients, namely clover hay at the 3rd cut (CH) as a control ration (R_1), fodder beet roots silage (FBRS) (R_2), sugar beet tops silage (SBTS) (R_3) and dried sugar beet tops (DSBT) (R_4). Each of these materials was given *ad lib.*

Concentrate feed mixture (CFM) formulated from undecorticated cottonseed meal (21%), yellow maize (32%), wheat bran (38%), molasses (5%), lime stone (3%) and common salt (1%).

For making silage, fresh SBT were wilted for 7-10 days to diminish the moisture content to about 67-70% before ensiling. During ensiling every layer of wilted SBT were well pressed using wheel tractor and sprayed with El-Mufeed* (50 Kg/ton of fresh basis). Silo were tightly covered by plastic sheet followed by approximately 30 cm layer of soil to maintain anaerobic

* El-Mufeed is composed of 91% molasses, 2.5% urea, 1.5% inorganic phosphorus, trace minerals and vitamin A which are dissolved in 5% water (Etman *et al.*, 1989)

condition. Fresh fodder beet roots were wilted and chopped using chopping machine, mixed with bean straw (150 Kg/ton fresh FBR) and ensiled as described by Mahmoud *et al.*, (1992). After two months the silo was opened, colour and odour were examined and representative samples were taken for chemical analysis before feeding animals.

The CFM was offered to animals once daily at 8 a.m., while CH, FBRS, SBTS and DSBT were offered after finishing the CFM and any refusal was collected and weighed to estimate the actual *ad lib.* intake. The animals were weighed biweekly in two successive days. Drinking water was available at all times. The daily milk yield was recorded for each goat for all tested groups. Milk samples about 0.5% of total milk produced were taken once biweekly from three goats of each group from the morning and evening milking of the same day. The samples were then composted and analyzed for total solids (TS), fat, protein and solids not fat (SNF) according to Ling (1963) procedures, while milk lactose was calculated by difference.

Before the beginning of the feeding trials, four digestion trials were conducted using metabolic cages to evaluate the tested rations, each trial lasted 21 days of which the first 14 days were considered as a preliminary period followed by 7 days as a collection period. Twelve zaraibi bucks with an average live weight of 50 Kg were involved in these trials (three bucks each).

The proximate chemical analysis of tested ingredients and faeces were analyzed according to A.O.A.C. (1990) procedures.

Efficiency of feed utilization was calculated as the amount of 4% FCM produced by 1Kg DM, TDN and DCP.

The economic efficiency for milk production, expressed as the ratio between the price of milk produced and the cost of feeds consumed.

Data were statistically analyzed using the linear model program of SAS (1990). The differences among means were tested using Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

The chemical analysis of tested ingredients and the composition of experimental rations are presented in Table (1). Results obtained indicate that R_3 (containing SBTS) has higher DM than R_2 (containing FBRS). This may be due to welting SBT for 5-7 days before ensilage. The results also show that R_3 and R_4 (containing DSBT) rations have lower OM contents than R_1 (containing CH) and R_2 whereas the former two rations were found to have higher ash contents. This can be explained on the basis that R_3 and R_4 contain sugar beet tops which contain high ash content (23.80-24.75%). However all of the tested rations (R_2, R_3 and R_4) were found to be practically isonitrogenous and isocaloric since they contained exactly similar gross energy and crude protein with the tendency to be closer to the values of control ration (R_1) as it was planned. R_2, R_3 and R_4 contained low CF contents, but R1 contained high CF. Meanwhile, NFE content was nearly similar in R_1, R_3 and R_4 but it was high in R_2.

The nutrient contents of FBRS, SBTS were within the range obtained by Eweedah (1986); Eweedah *et al.* (1999); Mahmoud *et al.* (1992); Bendary *et al.* (1992 a, b , 1993, 1999 and 2000); Baker (1995) and Mohi El-Din *et al.* (2000).

Table (1): Chemical composition of tested ingredients and calculated composition of the experimental rations (on DM basis%)

Items	DM	Chemical composition% (on DM, basis)						
		OM	CP	EE	CF	NFE	Ash	GE*
Clover hay (CH)	89.08	87.79	12.08	2.15	24.81	48.75	12.21	17.00
Fodder beet roots silage (FBRS)	22.83	88.99	10.84	1.35	14.11	62.69	11.01	16.81
Sugar beet tops silage (SBTS)	32.46	76.20	12.65	3.02	14.28	46.25	23.80	15.09
Dried sugar beet tops (DSBT)	84.18	75.25	11.13	2.61	12.16	49.35	24.75	14.64
Concentrate feed Mixture (CFM)	89.89	89.78	14.55	2.95	14.58	57.70	10.22	17.50
Calculated composition of the experimental rations								
CFM + CH control (R_1)	90.00	89.15	13.75	2.72	17.97	54.71	10.85	17.35
CFM + FBRS (R_2)	45.33	89.50	13.31	2.45	14.42	59.32	10.50	17.28
CFM + SBTS (R_3)	55.92	85.10	13.91	3.01	14.47	53.71	14.90	16.66
CFM + DSBT (R_4)	88.24	84.92	13.43	2.35	13.77	55.37	15.08	16.44

* GE = Gross energy (MJ/ Kg DM) = 0.0226 CP + 0.0407 EE + 0.0192 CF + 0.0177 NFE (MAFF, 1975)

Digestibility coefficients and nutritive values of the experimental rations are shown in Table (2). Results obtained revealed that the digestibility coefficients of all nutrients of the R_2 were the highest significantly ($P<0.01$) compared with those of the other rations, except that for DM which showed lowest value. The highest digestion coefficient of DM was scored for R_3.

Likewise, the highest feeding value expressed as TDN and DCP were recorded in R_2, while R_3 and R_4 were nearly similar in TDN and DCP contents and both recorded the lowest values, but R_1 fall intermediate. This may be due to the higher nutritive value of FBRS and CH than that of sugar beet tops (silage or dried) as reported by Rammah *et al.* (1984), Bendary *et al.* (1993) and Haggag *et al.* (1996). It may be of interest to note that the incorporation of fodder beet roots silage in the tested rations serves three purposes: (1) it reduces the fiber content compared with control (Table 1). (2) improves digestion coefficients and nutritive value (Table 2) and (3) it provides more readily available energy which improves protein utilization (Mahmoud *et al.*, 1992 and Bendary *et al.*, 1993).

Table (2): The digestion coefficients and nutritive values of tested rations by bucks.

Item	Rations				±SE
	R_1 (control)	R_2	R_3	R_4	
Digestion coefficients, %					
DM	65.63 ^{C}	61.62 ^{D}	73.63 ^{A}	71.37 ^{B}	0.59
OM	66.32 ^{D}	73.35 ^{A}	71.46 ^{B}	69.64 ^{C}	0.41
CP	66.58 ^{B}	70.15 ^{A}	62.23 ^{C}	62.99 ^{C}	0.47
EE	69.01 ^{A}	72.39 ^{A}	58.90 ^{B}	49.30 ^{C}	0.11
CF	50.33 ^{D}	66.51 ^{A}	57.89 ^{B}	54.54 ^{C}	0.50
NFE	73.66 ^{A}	72.02 ^{A}	68.91 ^{B}	72.38 ^{A}	0.56
Nutritive values, %					
TDN	62.73 ^{B}	65.62 ^{A}	58.04 ^{C}	58.65 ^{C}	0.36
DCP	9.16 ^{A}	9.34 ^{A}	8.66 ^{B}	8.45 ^{B}	0.06

A, B, C, D values with different superscripts in the same row significantly differed at P<0.01.

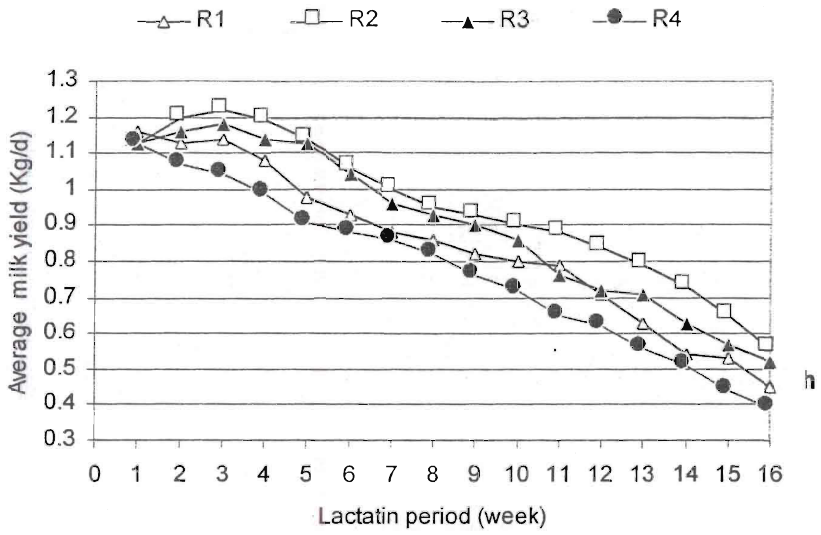
Concerning milk yield (MY) and its composition, the results in Table (3) and Figure 1 show that daily milk yield of goats fed R_2 (containing FBRS) recorded the highest significant (P<0.01) value (0.94 Kg/day) while those fed R_4 (containing DSBT) show the lowest (P<0.01) one (0.76 Kg/day) while R_1 and R_3 gave intermediate values (0.85 and 0.88 Kg/day, respectively). The milk yield (MY) of goats fed FBRS was significantly higher (P<0.01) than those fed SBTS, CH and DSBT by about 6.57, 10.06 and 19.07%, respectively. This could be attributed to the higher TDN intake (55.94 g/Kg$w^{0.75}$) by group fed R_2 than those fed other rations (Table 4), similar trend as that recorded for MY was observed with average daily FCM and ECM for all tested groups. The decrease in milk production in case of R_4 (contained DSBT) may be due to the fact that goats were unable to consume sufficient TDN (49.67 g/Kg $w^{0.75}$) and DCP (7.16 g/Kg $w^{0.75}$) to reach the milk production that might be achieved with R_2 contained FBRS (55.94 g/Kg $w^{0.75}$ TDN and 7.96 g/Kg $w^{0.75}$ DCP).

The protein%, TS% and SNF% of the produced milk were not significantly affected by any of the tested rations.

Table (3): Average daily milk yield, its composition and milk nutrients yield with lactating goats fed the tested rations

Item	Rations				± SE
	R_1 (control)	R_2	R_3	R_4	
Av. daily milk yield, kg	0.85 ^{B}	0.94 ^{A}	0.88 ^{AB}	0.76 ^{C}	0.01
Av. daily 4% FCM, kg	0.86 ^{B}	0.99 ^{A}	0.92 ^{B}	0.78 ^{C}	0.02
Av. daily ECM*, kg	0.95 ^{B}	1.09 ^{A}	1.02 ^{AB}	0.86 ^{C}	0.02
Fat %	4.08 ^{B}	4.36 ^{A}	4.25 ^{A}	4.12 ^{B}	0.04
Lactose %	4.52 ^{AB}	4.58 ^{A}	4.41 ^{B}	4.43 ^{AB}	0.04
Protein %	3.11	3.20	3.35	3.20	0.08
Total solids (TS) %	12.42	12.78	12.68	12.41	0.11
Solids not fat (SNF) %	8.34	8.42	8.430	8.30	0.13
Av. fat yield (g/h/d)	34.61 ^{B}	41.19 ^{A}	37.51 ^{B}	31.48 ^{C}	0.11
Av. lactose yield (g/h/d)	38.40 ^{B}	43.22 ^{A}	38.89 ^{B}	33.83 ^{C}	0.14
Av.protein yield (g/h/d)	26.38 ^{B}	30.18 ^{A}	29.52 ^{A}	24.47 ^{B}	0.08
Av.TS yield (g/h/d)	105.44 ^{B}	120.67 ^{A}	111.86 ^{AB}	94.84 ^{C}	0.31
Av.SNF yield (g/h/d)	70.83 ^{B}	79.46 ^{A}	74.35 ^{AB}	63.39 ^{C}	0.23

* ECM (Energy-Corrected Milk) = [7.2 x protein (kg/d) + 12.95 x fat (kg/d) + 0.37 x milk (kg/d)] (Tyrrell and Reid (1965)



The fat% and av. protein yield of milk did not show any significant differences among goats fed R_2 and R_3; and both rations favored the highest values, whereas R_1 and R_4 led to the lowest values. Meanwhile there were highly significant differences ($P<0.01$) between R_2, R_1, R_4 and between R_3, R_1, R_4 in this respect.

The lactose% was higher ($P<0.01$) with R_2 than R_3 and R_4. similar findings are found by Darwish *et al.* (1989), Bendary *et al.* (1993) and Bendary and Omar (1997) when fodder beet roots or its silage were incorporated in the ration of lactating Friesian cows.

Results in (Table 4) indicate that dry matter intake (DMI) expressed as Kg/h/day or g/Kg $w^{0.75}$ was practically equal in the four rations. The total digestible nutrients intake (TDNI) and digestible crude protein intake (DCPI) expressed as Kg/h/d or g/Kg/ $w^{0.75}$ clearly indicated that the highest value were recorded with R_2 followed by R_1, while R_3 and R_4 had equal, but lesser values.

The efficiency of feed utilization expressed as production efficiency for the tested rations (Table 4) indicated that, the goats fed R_2 and R_3 contained FBRS and SBTS, respectively, were more efficient than those fed R_1 (CH) and R_4 (DSBT).

Similar results were found by Bendary *et al.* (1993), Bendary and Omar (1997) and Mohi El-Din (1998) when FBRS or SBTS were incorporated in the ration of lactating cows. The better efficiency with FBRS and SBTS along with concentrate mixture rations (R_2 and R_3) might be attributed to the high nutrients digestibilities as well as the nutritive value of these rations (Table 4).

Perusal of the data concerning the economic efficiency of tested rations (Table 4), it could be deduced that goats fed FBRS and SBTS (R_2 and R_3) showed the highest economic efficiency (1.35 and 1.40, respectively) followed by DSBT (R_4) (1.23) whereas the lowest (1.06) was recorded for CH (R_1). Thus, fodder beet roots and sugar beet tops (dried or silage) reflect superiority over the control ration in their economic efficiency by about 27.36, 32.21 and 16.04% respectively, because R_1 had the highest cost (80 pt/Kg milk). These results are in agreement with those given by Bendary *et al.* (1996) who found that cows fed SBT (dried or silage) along with concentrate were the most economic milk producers as compared with cows fed traditional ration.

Table (4): Average daily feed intake, feed utilization efficiency and economic efficiency of milk production of lactating goats as affected by feeding experimental rations.

Item	Rations			
	R_1 (control)	R_2	R_3	R_4
Av. daily milk yield (Kg)	0.85	0.94	0.88	0.76
Av. Daily 4% FCM (Kg)	0.86	0.99	0.92	0.78
Av. daily feed intake as fed (Kg)				
Concentrate feed mixture (CFM)	1.00	1.00	1.00	1.00
Clover hay (CH)	0.50	--	--	--
Fodder beet roots silage (FBRS)	--	2.00	--	--
Sugar beet tops silage (SBTS)	--	--	1.450	--
Dried sugar beet tops (DSBT)	--	--	--	0.53
Total intake as fed	1.50	3.00	2.45	1.53
TDMI* (Kg/h/day)	1.35	1.36	1.37	1.35
TDMI (g/Kg $w^{0.75}$)	84.56	85.25	85.53	84.69
TDNI* (Kg/h/day)	0.84	0.89	0.80	0.79
TDNI (g/Kg $w^{0.75}$)	53.05	55.94	49.99	49.67
TDCPI* (Kg/h/day)	0.123	0.127	0.119	0.114
TDCPI (g/Kg $w^{0.75}$)	7.74	7.96	7.46	7.16
Av. 4% FCM production efficiency				
Kg 4% FCM /1 Kg DMI	0.64	0.73	0.67	0.58
Kg 4% FCM /1 Kg TDNI	1.02	1.12	1.14	0.98
Kg 4% FCM /1 Kg DCPI	6.93	7.83	7.69	6.82
Economic efficiency **				
Feed cost/d (pt.)	80.0	70.0	62.9	62.13
Price of milk produced (pt.)	84.90	94.40	88.20	76.40
Feed cost / Kg milk (pt.)	94.23	74.15	71.32	81.32
The economic efficiency **	1.06	1.35	1.40	1.23
Economic efficiency improvement%	--	27.36	32.21	16.04

*** TDMI = Total dry matter intake, TDNI = Total digestible nutrient intake, TDCPI = Total digestible crude protein intake.**

**** Calculated based on the price of tested ingredients being400, 600, 50, 20, 40 and 1000 LE/ton for CH, CFM, FBRS, SBTS, DSBT and milk, respectively.**

It may recall here that forages conserved such as hay and silage are normally cheaper per unit of energy than concentrate (Castle *et al.*, 1961 and Bendary and Omar, 1997). Consequently, increasing the proportions of such feeds in the dairy rations without adverse effect on milk yield and milk quality, the cost of feeding would be reduced (Mohi El-Din, 1998) which has been achieved in the present study.

Based on the aforementioned results it could be concluded that the nutritional and economical results of the present study encouraged using FBRS and SBT (dried or silage) for lactating goats with appreciable reduction in feeding costs; minimize the pollution and minimize quantities of the expensive concentrate feedstuffs used in animal feeding without any health troubles. Therefore, offering facilities needed to make silage or hay form green SBT and SBRS to the farmers (Training and extension .....etc) is very important and will encourage the farmers to use this by-product for feeding their animals.

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تأثير تغذية الماعز الحلابة على علائق تحتوي على عروش بنجر السكر (جافة أو سيلاج) وسيلاج بنجر العلف على كفائتها الإنتاجية.

بهيرة كامل محمد

معهد بحوث الإنتاج الحيواني- مركز البحوث الزراعية – وزارة الزراعة – الجيزة.

يهدف هذا البحث نحو دراسة تأثير تغذية الماعز الحلابة على علائق تحتوي على عروش بنجر السكر (سيلاج أو جافة) وسيلاج بنجر العلف على كفائتها الإنتاجية.

وقد أجريت تجربة تغذية لمدة ١١٢يوم على ثمانية وعشرين رأس من الماعز الزرايبي في موسم الحليب الثالث وتزن كل منها في المتوسط ٤٠كجم وتم تقسيمها عشوائيا إلى ٤ مجموعات متساوية، وقدم لكل منها كمية محدودة من مخلوط العلف المركز (بمعدل ١كجم/رأس/يوم) بالإضافة إلى دريس البرسيم. (عليقة المقارنة – ع١)، سيلاج بنجر العلف (ع٢)، سيلاج عروش بنجر السكر (ع٣) وعروش بنجر السكر الجافة (ع٤) للشبع.

كما تم إجراء أربع تجارب هضم على إثنى عشر جداء زرايبي زنة ٥٠كجم في المتوسط لتقييم القيمة الغذائية للعلائق المختبرة.

وقد أسفرت هذه الدراسة عن النتائج التالية.

١) لم يتأثر المأكول الكلي من المادة الجافة معبرا عنه بالكيلوجرام/ رأس/اليوم أو جم/وحدة حيز جسم تمثيلي بأي من العلائق المختبرة.

٢) كانت قيم معاملات الهضم لمعظم العناصر الغذائية للعليقة ع٢ المحتوية على سيلاج بنجر العلف أعلى معنويا (مستوى ٠,٠١) من مثيلاتها في العلائق الثلاث الأخرى حيث سجلت أعلى قيم غذائية معبرا عنها بالمركبات الغذائية الكلية المهضومة والبروتين الخام المهضوم عنها للعلائق ع١، ع٣، ع٤ على التوالي وقد سجلت ع٣، ع٤ قيما متساوية لكل من المركبات الغذائية الكلية المهضومة والبروتين الخام المهضوم.

٣) كان متوسط إنتاج اللبن المعدل كجم/يوم للماعز المغذاة على العليقة ع٢ أعلى معنويا (مستوى ٠,٠١) من تلك التي غذيت علي العلائق الثلاث الأخرى حيث كانت القيم المسجلة تساوي ٠,٩٩، ٠,٩٢، ٠,٨٦، ٠,٧٨ كجم/يوم للعلائق ع٢، ع٣، ع١، ع٤ على التوالي.

٤) لم تتأثر النسبة المئوية لكل من بروتين اللبن والمواد الصلبة الكلية والمواد الصلبة اللادهنية معنويا بأي من العلائق المختبرة. على أن النسبة المئوية لدهن اللبن وكذا متوسط إنتاج البروتين قد سجلت أعلى قيمة لها (مستوى ٠,٠١) في الماعز التي غذيت على العلائق ع٢، ع٣ عنها لتلك التي غذيت على ع١ أو ع٤ في حين كانت النسبة المئوية لسكر اللاكتوز في اللبن الناتج للماعز التي غذيت على العلائق ع١، ع٢، ع٤ أعلى معنويا (مستوى ٠,٠١) عنها في الحيوانات التي غذيت على العليقة ع٣، وكان معدل إنتاج المواد الصلبة الكلية والمواد الصلبة اللادهنية أعلى معنويا (مستوى ٠,٠١) في حالة تغذية الماعز العليقة ع٢ أو ع٣ منها عن تغذية الماعز العليقة ع١ أو ع٤.

٥) أظهرت الماعز التي غذيت على العليقة ع٢ (المحتوية على سيلاج بنجر العلف)، ع٢ (المحتوية على سيلاج عروش بنجر السكر) أعلى كفاءة إنتاجية من تلك التي غذيت على العلائق ع١ دريس البرسيم أو ع٤ عروش بنجر السكر الجافة.

٦) أوضحت دلالات نتائج الكفاءة الاقتصادية أن العلائق الثلاث المختبرة (سيلاج بنجر العلف، سيلاج عروش بنجر السكر، وعروش بنجر السكر الجافة) ذات كفاءة اقتصادية أعلى من عليقة المقارنة (دريس البرسيم) بمعدل ٢٧,٤%، ٣٢,٢%، ١٦,٠% على التوالي.

٧) هذا وعلى ضوء النتائج الموضحة سابقا فإنه يمكن التوصية باستخدام سيلاج بنجر العلف وعروش بنجر السكر (جافة أو سيلاج) في تغذية الحيوانات الحلابة وهذا من شأنه أن يساهم في حل مشكلة نقص الأعلاف خلال فصل الصيف كما يساهم في خفض تكلفة إنتاج اللبن.