Egyptian J. Nutrition and Feeds (2001) 4 (2): 101 - 111

INCLUSION OF SUGAR BEET PULP IN RUMINANT DIETS. 1- EFFECT OF UREATED SUGAR BEET PULP FEEDING LEVEL ON FEED UTILIZATION AND WEIGHT GAIN OF LOCAL GROWING SHEEP.

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SUMMARY

Eighteen, five months old (Ossimi x Rahmani) male lambs weighting 20.80±2.60 kg were randomly blocked by weight into three equal groups (I, II and III). 3% Ureated-unmolassed dry sugar beet pulp (USBP) was included to replace (w/w) common feed mixture based on grains and grain by products at 0, 50 and 100% to feed animals in groups I, II and III, respectively. Experimental mixtures were fed individually at 4% of body weight once daily and one kg/head of chopped fresh berseem (*Trifolium alexandrinum*) was offered daily after four hours of the morning meal. The feeding experiment was extended for 24 successive weeks. Feed intake and body weight were weekly and bi-weekly recorded, respectively. Three digestibility and N-balance trials were conducted on three animals of each group at the end of the experiment.

The chemical composition of feed mixtures indicated that as the level of USBP increased CF% increased and EE% decreased, while other nutrients showed comparable values in the different mixtures. Daily DM intake ($P<0.01$) declined on feed mixture containing 100% USBP (group III), while DM intake on the feed mixture containing 50% USBP was normal and similar to that of the control ration. Digestion coefficients for CP and EE were ($P<0.01$) lower on 100% USBP ration but the CF digestibility was ($P<0.01$) higher on both rations containing either 50 or 100% USBP. Values of TDN% were comparable among experimental rations, while DCP% ($P<0.01$) decreased on ration containing 100% USBP. Apparent dietary N utilization ($P<0.05$) improved on 50% USBP ration in comparison with control (23.21% VS. 18.61%). In the contrast, N utilization sharply declined to 8.31% on the ration containing 100% USBP. Average daily gain (ADG) improved by 30% on 50% USBP ration in comparison with control (188.5 vs. 145.4 g/d), meanwhile ADG ($P<0.01$) extremely declined to 64.32 g/d on 100% USBP ration due to lower DMI. Feed conversion in terms of kg DM or TDN per Kg gain was ($P<0.05$) better with feeding 50% USBP ration than that of control (0% USBP). While both ADG and feed conversion were significantly ($P<0.01$) deteriorated by feeding for sheep with 100% USBP ration.

In conclusion, dried unmolassed – sugar beet pulp supplemented with 3% urea at 50% replacement (w/w) of the common feed mixture is highly advisable in the practical feeding of growing sheep. It is worth saying that, feeding 100% USBP ration could be associated with adverse nutritional results due to its limitative effect on feed intake of sheep.

Keywords: Sugar beet pulp, sheep, digestibility, N-balance, growth performance.

INTRODUCTION

Beet pulp is the residue left from ground sugar beet after sugar extraction. This residue is comprising 6% of the total fresh weight of harvested sugar beet (Kjaergaard, 1984). Since 1982, there has been a developing tendency in Egypt to increase the sugar production from beet. The annual amounts of sugar beet pulp as a result were increased from 3.700 tons in year 1982 to a nearly 170.000 tons in year 2000 (Statistics of El-Delta Sugar Company, 2000). Sugar beet pulp (SBP) is available in the local market in a dry unmolassed cubes. (10% DM) and it is usually used as an energy source feed-stuff for ruminants.

It was stated in previous studies that the chemical composition of the dried SBP is ranging 83.80-92.49% for dry matter (DM), 9.33 - 10.71 % for crude protein (CP), 0.10 - 2.40% for ether extract (EE), 18.40-22.37% for crude fiber (CF), 59.34-65.69% for nitrogen free extract (NFE) and 3.25-6.67% for ash on DM basis (Woodman and Calton, 1928; Bhattacharya and Sleiman, 1971; Castle, 1972; Kelly, 1983; NRC, 1989; Mansfield *et al.*, 1994; Maareck, 1997 and El-Badawi, 1999). Several authors concluded that although approx. 85% of the nitrogenous substances of dried SBP are presented in the form of true protein, its digestibility is lower than that of maize or barley grains (Boucque *et al.*, 1976). Moreover, the CF content of beet pulp is considerably high and the contents of fast fermentable carbohydrates and ether extract are much lower than those of high energy grains (Castle *et al.*, 1981 and Haaksma, 1982). Even though, the early work of McCready (1966) illustrated that beet pulp contains in average 76% of its dry weight as carbohydrates in the form of homo and hetero polymers, where cellulose and pectin fractions are comprising 50% of SBP dry weight. The cellulose fraction of SBP is almost amorphous and easily hydrolizable (Kjaergaard, 1984) and pectins are not covalently linked to a lignified matrix, so it could be a valuable source of readily fermentable carbohydrate to enhance rumen microbes biosynthesis (Metwally and Stern, 1989). The unique chemical structure of beet pulp as a high fibrous-high energy feed-stuff was administered in feed mixtures to substitute grains (barley, maize or oat) for feeding small or large ruminants. The TDN value of dry unmolassed beet pulp was reported to range 68-74% and the ME value estimated on sheep was 2.99 Mcal/kg (Boucque *et al.*, 1976; Crawshaw, 1990 and Mandebvue and Galbrait, 1999). The nutritive value of kg SBP was reported to equal 0.8 kg of corn or 0.9 kg of barley (Kelly, 1983). However, in most studies the replacement level in grains with SBP was between 50 to 75% of the feed mixture.

This study was designed to investigate the nutritional effects of partial or complete replacement of common feed mixture (based on grains and grain by products) by ureated-sugar beet pulp on feed utilization and weight gain of local growing sheep.

MATERIALS AND METHODS

Eighteen cross-bred (Ossimi x Rahmani) male lambs aged five months old weighed in average 20.80 ± 2.60 kg were randomly blocked by weight in three equal groups I, II and III. Experimental animals were housed in three separate shaded pens fitted with wooden barriers to facilitate individual feeding and watering. Ureated unmolassed-dry sugar beet pulp (USBP) was weekly prepared by spraying a solution of 30g urea dissolved in 100 ml water per kg of beet pulp. Three feed mixtures containing 0, 50 and 100% (w/w) USBP in replacement of common concentrate feed mixture (15.20% CP on DM basis) were formulated to be fed groups I, II and III, respectively. Experimental mixtures in mash were offered at 4% of body weight once daily on 8.00 a.m., while chopped fresh berseem (*Trifolium alexandrinum*) fed at one kg/head was offered after four hours of the morning meal. The feeding experiment extended for 24 successive weeks. Feed consumption and feed refusals were weekly recorded. Offered amounts of feed mixtures were bi-weekly adjusted according to changes of body weight. Drinking water was freely available. Animals were weighed bi-weekly. At the end of the feeding period, three digestibility and N-balance trials were carried out on three animals of each group to evaluate nutrient digestibility and dietary N utilization. Each trial lasted 15 days, preliminary and collection periods lasted for 10 and 5 days, respectively. Chemical composition of feeds, faeces and urinary nitrogen was determined according to A.O.A.C. (1990). Collected data for measured parameters were statistically analyzed applying the one way analysis of variance by using the General Linear Models Procedure adapted by SAS (1988) for PC computers. Significant means were separated using the L.S.D. test according to Duncan (1955).

RESULTS AND DISCUSSION

The chemical composition of experimental feed mixtures given in Table (2), indicated that the CF content was increased and EE content decreased by increasing the replacement level of USBP in the feed mixture, however CP and NFE contents were similar in all mixtures. Mean daily amounts of offered, refused and consumed feeds by animals in experimental groups are given in Table (3). It was clear that animals of group III (100% USBP) refused to eat 28.3 % of the total offered DM and their daily DM intake was 2.80% of body weight over the whole feeding period. Daily DM intake per 100 kg body weight with advancing feeding period is shown in Fig1. It was obvious that animals fed on 100% USBP ration could not consume more than 2.5% DM of body weight during the first 12 weeks, however, the daily DMI gradually increased and reached nearly 3% of body weight during the last 12 weeks of the feeding period. The daily DMI of the other two groups (I and II) was nearly similar, while a slightly lower consumption was experienced on ration containing 50% USBP than control during the first 6 weeks of the experiment. The present results are pointing out that complete replacement of common feed mixture with 3% ureated-SBP significantly ($P<0.01$) decreased the daily DM intake, while such depressive effect was not emerged clearly by feeding USBP at 50% replacement level in the feed mixture. Meanwhile, it seems that feeding USBP even at the lower inclusion level (50%) needed an adaptation period of 6 weeks to get animals to reach into a steady-state feeding status.

The present results concerning the effect of the feeding SBP on DM intake was confirmed by many studies. Bhattacharya and Sleiman (1971) found no effect on DMI of wethers fed ration contained 60% SBP in replacement of maize. In another study Bhattacharya *et al.* (1975) found that DM intake of sheep decreased by 15% with increasing SBP in ration from 45 to 90% in replacement of barley. Similar conclusion was reached by Mahmoud *et al.* (1998) that dried SBP could be included in lambs finishing rations to replace 50% of the dietary energy source. Mandebvu and Galbraith

(1999) found from their study on 48 (Suffolk x Mule) lambs fed rations containing 25, 50, 75 and 100% molassed-SBP with replacement of barley that DM intake decreased as the replacement level with SBP increased more than 75% of the total ration. Mohsen *et al.* (1999) advised that dried SBP could replace 50% of the traditional concentrate mixture in rations of Angora goat kids.

Although all of the previous studies confirmed the depressive effect of SBP and/or USBP on DM intake when included more than 75% of the ration, non of these studies gave reasons to explain such criteria. Eventually, there are many factors which could influence the consumption of rations containing high level of SBP like; daily feeding level, length of feeding period, particle size of SBP, rate of passage and degradation kinetics, specific enzymatic activities in the rumen, water absorption property of dried SBP...etc. One or more of these factors could be responsible for limiting the consumption of SBP by different types of ruminants.

Results of nutrient digestion and nutritive values of experimental rations are given in Table 4. There was an obvious effect of USBP level on CP, EE and CF digestibilities by sheep in experimental groups. Crude protein digestion coefficient (P<0.01) decreased on ration containing 100% USBP, while the difference in CP digestibility did not attain any significancy with 50% USBP ration in comparison with control. Ether extract digestibility (P<0.01) decreased on rations containing either 50 or 100% USBP. Williams *et al.* (1987) on Friesian bull calves, Thomas (1988) on finishing cattle and Eweedah *et al.* (1999) on Merino lambs found that both CP and EE digestibilities were significantly decreased by feeding rations containing SBP in replacement of grain or concentrate mixture. In contrast, crude fiber digestibility (P<0.01) improved with including USBP at 50 or 100% in experimental rations. Digestion coefficients of CF were close to corresponding values of NFE digestibilities of rations containing 50 or 100% USBP (74.90 vs. 78.79 for 50% USBP and 74.53 vs 80.31 for 100% USBP). In this context, Gihad *et al.*, (1989) reported that CF digestibility (P<0.05) increased when concentrate mixture was completely replaced by ureated-molassed SBP in rations of growing sheep. Similar conclusion was reported by Mansfield *et al.* (1994) who stated that CF content of SBP could be digested as efficently as NFE fraction in rations of Holstein cows. The NFE digestibility did not show any significant differences among groups. This is in agreement with the findings of Bhattacharya and Sleiman (1971), Bhattacharya *et al.* (1975), Mahmoud *et al.* (1998) and Mohsen *et al.* (1999), who reported that NFE digestibility was not influenced by including SBP from 25 to 100% in sheep and goats rations. Nutritive values of experimental rations in terms of TDN % were insignificantly higher for rations containing USBP (50 or 100%) than that of control. However, the DCP% (P<0.01) decreased with increasing USBP to replace 100% of CFM. Nitrogen balance results shown in Table (5) indicated that sheep fed 100% USBP ration apparently retained less (P<0.01) dietary N than those fed the other two rations (0 or 50% USBP). Faecal N to urinary N ratio illustrated that urinary N losses were lower on rations containing either 50 or 100 % USBP than control. Apparent N utilization (NB/NI X 100) significantly (P<0.05) improved on ration with 50 % USBP, while the dietary N utilization severely dropped (P<0.01) on ration containing 100% USBP. Gihad *et al.* (1989), Mandebvu and Galbraith (1999) and Mohsen *et al.* (1999) found

Table 1. Proportional replacement (w/w) of common feed mixture with ureated sugar beet pulp in experimental feed mixtures.

Item	Feed mixtures		
	I (Control)	II	III
	% on as fed basis		
Common feed mixture (CFM)[i]	100	50	-------
3% Ureated sugar beet pulp (USBP)	-------	50	100

i Commercial feed mixture consisting of (on as fed basis): 30% undecorticated cotton seed meal, 30% yellow corn, 30% wheat bran, 7% cane – molasses, 2% lime stone and 1% sodium chloride.

Table 2. Chemical composition of experimental feeds.

Item	DM %	DM composition, %				
		CP	EE	CF	NFE	Ash
100% CFM (I)	88.61	15.20	2.50	14.61	60.28	7.41
50% CFM + 50% USBP (II)	89.30	15.26	1.82	17.08	59.90	5.94
100 % USBP (III)	89.95	15.30	1.40	19.68	59.20	4.42
Berseem fodder	10.00	13.09	2.00	24.76	43.09	17.06

Table 3. Mean daily amounts of offered, refused and consumed feeds by sheep in experimental groups.

Item	Experimental groups			SE
	I (Control)	II (50% USBP)	III (100% USBP)	
No. of animals	6	6	6	
Mean body weight, (±SD)				
Kg	34.17±7.88 ^{a}	39.21±8.34^{a}	27.90±8.13^{b}	3.31*
kgW $^{0.75}$	14.08±2.42^{a}	15.61±2.51^{a}	12.06±2.59^{b}	1.03*
Mean of daily feeds (DM basis),kg				
Offered:				
Feed mixture	1.198	1.348	0.984	
Berseem	0.100	0.100	0.100	
Refused:				
Feed mixture	0.00	0.081	0.325	
Berseem	0.00	0.00	0.00	
Consumed:				
Feed mixture	1.198	1.267	0.659	
Berseem	0.100	0.100	0.100	
Refused of offered feeds,%	0.00	5.5	28.3	
DM intake, (±SD):				
kg/d	1.30±0.27^{Aa}	1.37±0.26 ^{Aa}	0.76±0.11^{B}	0.09**
g/kgW$^{0.75}$	91.37±3.79^{Aa}	87.25±4.16^{Aa}	63.63±4.64^{B}	1.71**
Kg per 100 kg body weight	3.81±0.09^{Aa}	3.50±0.17^{Aa}	2.80±0.38^{B}	0.10**

NS = non-significant difference. * P < 0.05 ** P < 0.01
a,b means with different superscripts in the same row are different at P<0.05
A,B means with different superscripts in the same row are different at P<0.01

Table 4. Nutrient digestibility and nutritive values of experimental rations by sheep.

Item	Experimental rations I (Control)	II (50% SBP)	III (100% USBP)	SE
No. of animals	3	3	3	
Mean body weight, kg	45.33	51.83	48.00	
Mean daily DM intake, kg	1.71	1.82	1.29	
DMI of body weight, %	3.77	3.49	2.69	
Nutrient digestibility, %				
OM	70.92	75.53	74.39	1.51^{NS}
CP	69.15^{Aa}	65.74^{Aa}	52.98^{B}	1.77**
EE	74.07^{A}	55.00^{B}	60.60^{B}	2.12**
CF	55.92^{B}	74.90^{Aa}	74.53^{Aa}	2.77**
NFE	75.07	78.79	80.31	1.31^{NS}
Nutritive value on DM basis (±SD),%				
TDN	67.60±3.12	72.69±1.62	70.15±2.11	1.37^{NS}
DCP	$10.43±0.59^{Aa}$	$9.99±0.29^{Aa}$	$7.98±0.44^{B}$	0.27**

NS = non-significant difference. ** P < 0.01
a,b means with different superscripts in the same row are different at P<0.05
A,B means with different superscripts in the same row are different at P<0.01

Table 5. Nitrogen utilization of experimental rations by sheep.

Item	Experimental rations I (Control)	II (50% SBP)	III (100%USBP)	SE
No. of animals	3	3	3	
Nitrogen intake (NI) , g/d	41.18	47.74	30.96	
Faecal nitrogen (FN) , g/d	12.87	16.31	14.60	
Digestible nitrogen (DN) , g/d	28.31	31.43	16.36	
Urinary nitrogen (UN) , g/d	20.58	20.52	13.84	
FN:UN ratio	1 : 1.60	1 : 1.24	1 : 0.95	
N-balance, g/d (NB) , g/d	7.67^{Ab}	11.12^{Aa}	2.56^{B}	1.13**
NB of NI, % (±SD)	$18.61±5.12^{Ab}$	$23.21±3.80^{Aa}$	$8.31±1.24^{B}$	2.17**

NS = non-significant difference. ** P< 0.01
a,b means with different superscripts in the same row are different at P<0.05
A,B means with different superscripts in the same row are different at P<0.01

Table 6. Body weight gain and feed conversion of growing sheep fed on experimental rations.

Item	Experimental groups I (Control)	II (50% USBP)	III (100% USBP)	SE
No. of animals	6	6	6	
Feeding period, week	24	24	24	
Initial body weight, kg (±SD)	23.15±6.27	23.12±5.64	22.15±7.09	2.60^{NS}
Final body weight, kg (±SD)	$47.58±9.64^{Ab}$	$54.83±9.20^{Aa}$	$32.92±8.86^{B}$	2.38**
Average daily gain, g (±SD)	$145.4±22.10^{B}$	$188.5±25.43^{A}$	$64.32±12.88^{C}$	8.50**
Feed conversion, kg/kg gain (±SD):				
DM	$8.89±0.92^{Ba}$	$7.23±0.82^{Bb}$	$11.97±1.38^{A}$	0.43**
TDN	$6.01±0.62^{Ba}$	$5.26±0.59^{Bb}$	$8.39±0.97^{A}$	0.30**

NS = non-significant difference. ** P < 0.01
a,b means with different superscripts in the same row are different at P<0.05
A,B,C means with different superscripts in the same row are different at P<0.01

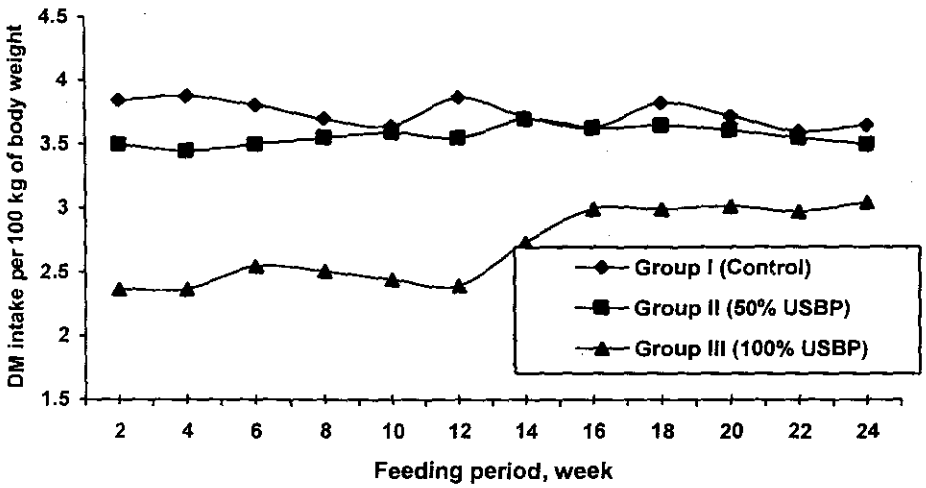

Fig.1. DM intake per 100 kg body weight of sheep in experimental groups with advancing feeding period.

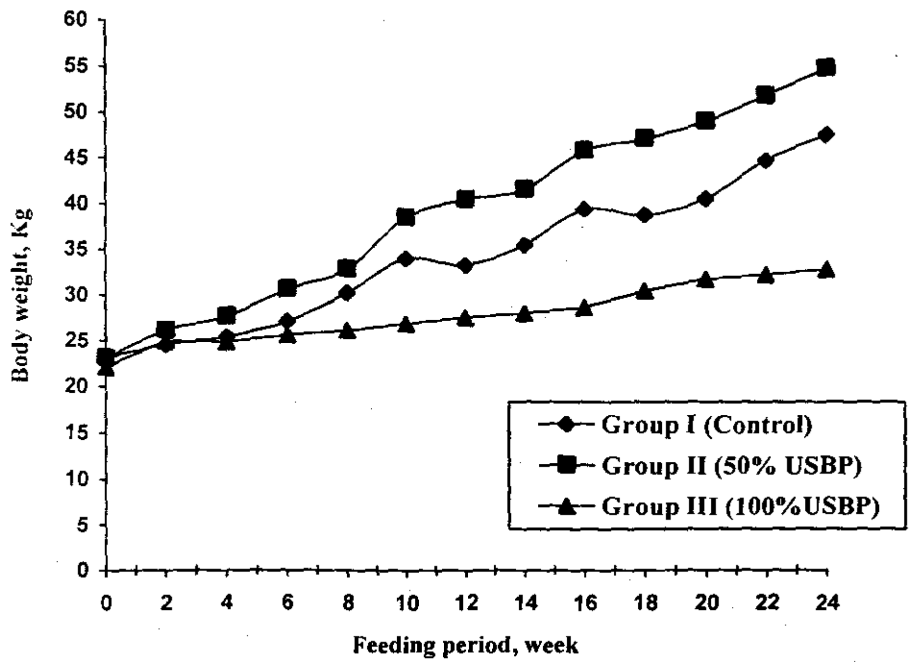

Fig. 2. Body weight of growing sheep in experimental groups.

that N utilization was increased in sheep and goats by feeding rations containing up to 50% SBP. Meanwhile, the adverse effect of all SBP diets on N utilization had not been explained in the previous studies. The reason might be, that some specific enzymes are not liberated in the rumen media to provide sufficient yield of readily fermentable carbohydrates for rumen microbes on rations of high (100%) USBP, hence lower N utilization could be expected.

Body weight of sheep in experimental groups is given in Fig 2, and means of daily gain and feed conversion are shown in Table 6. It was clear that sheep fed on 50% USBP ration had the highest ADG, while the lowest weight gain was experienced on 100% USBP ration mainly due to lower feed intake. Inclusion of USBP at 50% to replace CFM increased ($P<0.05$) ADG of sheep by nearly 30% in comparison with the control ration (188.5 vs. 145.4 g/d). Feed conversion as kg DM or TDN/kg gain was significantly ($P<0.05$) improved on ration including 50% USBP in comparison with control. However, feed conversion was ($P<0.01$) deteriorated with feeding ration of 100% beet pulp. These results are in agreement with the finding of Bhattacharya *et al.* (1975) who reported that growing fattening sheep fed on diet contained 45% DSBP + 45% corn gained faster and required less feed per unit of gain than those fed on either 90% corn or 90% DSBP. Similar conclusion was reported by Boucque *et al.* (1976) who suggested that complete dry diets 50% SBP fed according to appetite resulted in high animal performance and high feed efficiency of young bulls. Mandebvu and Galbraith (1999) added that any limitation in growth performance by lambs fed a diet containing 100% molassed-SBP may be effectively abolished by the replacement with barley at a substitution rate of 25% or greater.

It could be concluded that, inclusion of dried beet pulp supplemented with 3% urea (USBP) at 50% of the common feed mixture is highly advisable to improve weight gain and feed efficiency of growing local sheep. However, the complete replacement with USBP has an adverse nutritional effect on the performance of growing sheep.

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إدخال تفل بنجر السكر فى تغذية المجترات. ١- تأثير مستوى إحلال تفل بنجر السكر المعامل باليوريا فى المخاليط العلفية على معدل الاستفادة الغذائية والزيادة الوزنية للأغنام المحلية النامية.

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أجريت هذه الدراسة لبيان تأثير الإحلال الجزئى أو الكلى بتفل بنجر السكر الجاف المضاف إليه ٣% يوريا فى مخلوط العلف المعتاد (المعتمد على الحبوب وبقاياها) على معدلات الاستفادة الغذائية والزيادة الوزنية للأغنام المحلية النامية.

استخدم فى إجراء التجربة عدد ١٨ رأس من ذكور الحملان (أوسيمى × رحمانى) كان متوسط أعمارها خمسة اشهر ومتوسط أوزانها ٢٠,٨٠ ± ٢,٦٠ كجم قسمت إلى ثلاث مجموعات متساوية عددياً حيث غذيت حيوانات كل مجموعة على أحد المخاليط العلفية التالية:

المجموعة الأولى: ١٠٠ % مخلوط العلف المعتاد.

المجموعة الثانية: ٥٠% مخلوط العلف المعتاد + ٥٠% تفل بنجر سكر معامل بـ ٣% يوريا.

المجموعة الثالثة: ١٠٠% تفل بنجر سكر معامل بـ ٣% يوريا.

كانت المخاليط العلفية التجريبية تقدم مرة واحدة يومياً بمعدل ٤% من وزن الجسم بالإضافة إلى ١كجم برسيم طازج للرأس / يومياً، وكان نظام التغذية فردياً فى جميع المجموعات. استمرت التغذية على العلائق التجريبية لمدة ٢٤ أسبوعاً متصلة أعقبها إجراء ثلاث تجارب هضم وميزان نيتروجين لتقدير معامل هضم المواد الغذائية المختلفة وكذلك مدى الاستفادة من بروتين العلائق التجريبية.

وقد اشارت نتائج الدراسة إلى أن التركيب الكيميائى للمخلوط العلفى يتغير تبعاً لنسبة الإحلال بتفل البنجر حيث ارتفعت نسبة الألياف الخام وانخفضت نسبة مستخلص الدهن بزيادة نسبة الإحلال بينما لم يتأثر محتوى كل من البروتين الخام والكربوهيدرات الذائبة بدرجة ملحوظة فى المخاليط العلفية المستخدمة. كان للإحلال الكلى بتفل بنجر السكر (١٠٠% تفل بنجر) تأثير معنوى ($P<0.01$) على انخفاض كمية المادة الجافة المأكولة بينما لم يلاحظ انخفاض كمية المادة الجافة المأكولة عند إدخال تفل البنجر حتى مستوى ٥٠% فى المخلوط العلفى. أظهرت تجارب الهضم انخفاض ($P<0.01$) كل من معامل هضم البروتين الخام ومستخلص الدهن بزيادة نسبة إحلال تفل البنجر فى المخلوط العلفى، بينما ارتفع ($P<0.01$) معامل هضم الألياف الخام فى المخاليط المحتوية على ٥٠% أو ١٠٠% تفل بنجر مقارنة بالعليقة الضابطة. كما أظهرت نتائج تجارب ميزان النيتروجين تحسن ($P<0.05$) معامل الاستفادة من بروتين العليقة بإدخال تفل البنجر بنسبة ٥٠% فى المخلوط العلفى، بينما تدنى بشدة معامل الاستفادة من بروتين العليقة المحتوية على ١٠٠% تفل بنجر مقارنة بالعليقة الضابطة، على الرغم من تساوى نسبة البروتين الخام فى جميع المخاليط العلفية. ارتفع معدل الزيادة الوزنية معنوياً ($P<0.01$) للأغنام المغذاة على المخلوط العلفى المحتوى على ٥٠% تفل بنجر سكر مقارنة بتلك المغذاة على المخلوط العلفى المعتاد،

وكان معدل الزيادة الوزنية مرتفعاً بنسبة حوالى ٣٠% للحيوانات المغذاة على العليقة المحتوية على ٥٠% تفل بنجر سكر مقارنة بالزيادة الوزنية للحيوانات المغذاة على العليقة الضابطة (١٨٨,٥ جم/يوم مقابل ١٤٥,٤ جم/يوم)، بينما انخفض بشدة معدل الزيادة الوزنية للحيوانات المغذاة على المخلوط العلفى المحتوى على ١٠٠% تفل بنجر نتيجة انخفاض كمية المادة الجافة المأكولة. وقد كان أفضل معامل تحويل غذائى للحيوانات المغذاة على المخلوط المحتوى على ٥٠% تفل بنجر (٥,٢٦ كجم مادة غذائية مهضومة/ كجم زيادة وزنية)، بينما بلغ معامل التحويل الغذائى للحيوانات المغذاة على ١٠٠% تفل بنجر ٨,٣٩ كجم مادة غذائية مهضومة/ كجم زيادة وزنية.

من خلال النتائج التى أمكن التوصل إليها من هذه الدراسة يمكن التوصية بجدوى استغلال تفل بنجر السكر المعامل بـ ٣% يوريا ليحل محل ٥٠% من مخلوط العلف المعتاد المعتمد على الحبوب وبقاياها لتحسين معدلات الاستفادة الغذائية والزيادة الوزنية للأغنام المحلية النامية، مع الأخذ فى الاعتبار أن الإحلال الكامل بتفل بنجر السكر محل المخاليط العلفية المعتادة يكون مصحوباً بانخفاض كمية المادة الجافة المأكولة وبالتالى انخفاض معدل الزيادة الوزنية وكذلك تدنى معامل التحويل الغذائى للأغنام النامية.