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EFFECT OF FEEDING DIFFERENT BERSEEM SILAGES ON DAIRY COWS PERFORMANCE.

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ABSTRACT

Three different berseem silages were evaluated in this study. Berseem was chopped into 3-5 cm, then sun dried to get wilted berseem silage (S1) or mixed with ground barley grains (S2) or ground corn grains (S3) at 75:25%. Part from each type of silage was packed in double layer bags (50 Kg each for exp. 1) and the other part was kept in over ground silo (for exp. 2) for 70 days.

Two experiments were carried out to:

1) evaluate the quality and nutritive value of different silages via laboratory analysis and digestion trials using three adult male balady sheep in a Latin square 3x3 design (Exp. 1). and
2) compare the effect of feeding berseem silage with berseem hay rations on the performance of milk production using four lactating Holstein Friesian cows in "Swing Over" design (Exp. 2).

Data indicated that corn-berseem silage (S3) had the best silage characteristics, nutritive values and nitrogen balance compared with other barley-berseem silage (S2) or wilted berseem silage (S1). Cows fed ration contained S3 produced more milk than those fed ration contained berseem hay. There were insignificant differences in milk composition between cows fed berseem hay or corn-berseem silage rations, except that there was a significant increase in solids not fat and ash content in milk of cows fed corn-berseem silage ration. Also, the lowest feeding cost per 1 kg 4% fat corrected milk was observed in feeding corn-berseem silage group being 0.72 L.E. compared to 0.89 L.E. in berseem hay group.

In conclusion, feeding dairy cows on corn-berseem silage may improve the performance of milk production and decrease the cost of milk production.

Keywords: Berseem, silage, digestibility, dairy cow, .

INTRODUCTION

Egyptian clover (*Trifolium alexanderium*, L.), locally called berseem, is the main forage crop in Egypt from December to May. Generally, the total production of clover exceeds the animal requirements during this period. Therefore, It is advisable to conserve the surplus of forage either in the form of hay or silage to be used during the shortage of forages. Silage seems to be the best solution for animal feeding when green fodders are scarce (Kawashima *et al* ., 1996). Feeding alfalfa silage optimize the animal performance as a result of minimizing dry matter losses , not only during the ensiling process but also during feeding -out (Khalili *et al*., 2005). Making hay from clover by the traditional method is proved wasteful, up to 70% losses in nutrients, (Dhiman and Satter,1997). Moreover, there are several limitations for the hay making process including : a) the weather conditions which are usually unsuitable for drying except during the last cut of berseem , (b) the great loss of leaves which contain most of protein and carotene of berseem , and (c) the high cost of the artificial methods of drying. So, preserving berseem as silage seems to be the best method for the following advantages:-

1- Silage making can be undertaken under any weather conditions.
2- Good silage has high nutritive value as a result of decreasing the nutrients loss particularly carotene, soluble carbohydrates and protein.
3- Cost of silage making is lower than that of hay.

On the other hand , hay or silage making from the first cut of berseem is still difficult owing to its high moisture content. So, adding some ground grains to first cut berseem, which is high in moisture and protein content, during ensiling process may improve silage quality. This addition is sometimes found necessary when silage making from legumes.

The objectives of the present study are: a) investigating the effect of type of grains (corn or barley) addition to berseem during silage making on silage quality and nutritive value and b) comparing the effect of feeding corn-berseem silage with berseem hay rations on the performance of lactating cows.

MATERIALS AND METHODS

This study was carried out at the Agriculture Experimental and Researches Station , Faculty of Agriculture , Cairo University. Two experiments were carried out, experiment I , (from March 2003 to Junury 2004) to evaluate the quality and the nutritive value of the different silages. While, experimente II , was carried out from March2004 to November 2004 to compare the effect of feeding berseem-corn silage or berseem hay rations for lactating cows on milk composition and production.

Experiment I :

Ensiling procedures:

Third cut berseem was collected and chopped into 3-5 cm, then sun dried for two days to get wilted berseem silage (S1) or was mixed with ground barley grains (S2) or ground corn grains (S3) at 75:25%. Each type of silage was packed in double layer bags (50 Kg each) for 70 days. After the incubation period samples were taken to evaluate silage quality and digestion trials were carried out .

Silage quality :

To determine silage quality , water extracts of the silages were prepared by extracting homognized (25g wt) silage samples with 100 ml distilled water for 10 min. in a blender (Waldo and Schultz , 1956) . The homogenated material was fillterd through four layers of cheese cloth ,then the filtrate was used for measuring pH using pH meter, ammonia nitrogen (NH_3-N) by Kjeldahl method and lactic acid by HPLC (Column:Rezex organic acid , Dimensions: 300 X 7.8 , Mobile phase: 1% orthophosphoric, flow rate :0.8 ml / min. Detector : Uvand wave length 210 nm) according to Abou Akkada and EL-Shazly (1964).

Digestion trails :

Three adult male balady sheep (average weight 55 kg) were used in a Latin square 3X3 design to evaluate the different silages (wilted, barley-berseem silage and corn-berseem silage).Animals were fed (maintenance requirements) individually in metabolic cages for 15 days as preliminary period , then feces and urine were quantitatively collected during the next seven

days. All animals were received sodium bicarbonate (as a buffer) by 1% from total dray matter intake. Representative samples of one tenth of the vioded feces and excreted urine were taken daily just after collection . Urine samples were stored in tight bottles containing sulfuric acid (1:1) and refrigerated at 4°C for N- determination. Feces samples were weighed and dried at 60°C in a hot air oven. The dried samples of feces and feeds were ground to pass through 1mm sieve, and the representative samples of feed and feces were stored in emeried bottles for chemical analysis. Meanwhile, the digestion coefficients and nutritive values of the experimental silages were calculated.

Rumen liquor parameters:

At the terminal of the digestion trails , rumen liquor samples were taken via stomch tube just before the morning meal as zero time, then at 2 and 4 hours post feeding . Rumen samples were filtered through two layers of cheese cloth, then samples were subjected immediately for determination of pH, NH_3-N and total volatile fatty acids ($TVFA'_S$).

Experiment II :-

The best type of silage in the first experiment (corn-berseem silage) was used in a comparative study with berseem hay rations to evaluate its effect on the performance of dairy cows and their milk composition.

Ensiling procedures:-

Berseem (3 rd. cut) was chopped into 3-5 cm and mixed with 25% of ground corn grains and kept inside over ground silo with dimensions of 4× 3 ×1.5 m length, width and hight, respectively. Walls of the silo were covered with polyethylene sheet and the top of silo was covered by thin layer of polyethylene sheet (100mm), then clay layer of approximately 20 cm thickness was spread over the polyethylene sheet. After 10 weeks, the heap siloes were opened from one side by removing the front part of the cover. Silage was taken out by cutting it vertically then it was offered to dairy cows daily.

Experimental animals and rations:-

Four lactating Holistine Friesian cows (in 2^{nd} and 3^{rd} lactation seasons) weighed 577 kg in average and in their mid-lactation stage were arranged in three swing over design (El-Serafi, 1968). The experiment started and ended with the ration of berseem hay (control, C) between them the ration of corn-berseem silage (tested, S), where the two controls are required to adjust the normal daily decrease in milk yield and daily increase in fat percentage. The experiment was carried out for 108 days in three periods, each period consisted of 21 days for adaptation and 15 days for collection. Animals in the control group (C) were fed berseem hay plus concentrate feed mixture (CFM),while, in the tested ration (S) animals were fed corn-berseem silage plus CFM.

Feeding procedures :-

Animals were fed individually on the experimental rations to cover energy and protein requiremnts according to NRC(1990). Rice straw was offered *ad* lib for all animals. The rations were offered twice daily after the milking at 8.0 a.m. and at 3.0 p.m.. Animals fed silage were received sodium bicarbonate (as a buffer) by 1% from total dray matter intake. Water was

available at all times. The daily offered and orts were recorded individually for each animal.

Milk recording :-

Cows were hand milking twice daily (8.0 a.m. and 3.0 p. m.) and daily milk yield was individually recorded and corrected to 4% FCM according to Gaines(1923).

Milk Sampling and analysis :-

Two milk samples were individually collected from each cow at 8.0 a.m. and 3.0 p.m. during the 15 days- collection period, then the two samples were composited. Chemical analysis of milk fat, protein, solids non fat, total solids and ash were determined using milkoscan apparatus. Milk fat percentage was determined according to Gerber's method as described by Ling (1963).

Digestion trials:- At the end of collection period nutrients digestibility were determined by the acid insoluble ash (**AIA**) technique as described by Van Keulen and Young (1977). Whereas, fecal rectum samples were collected for four successive days from each animal. Samples of ration and feces were collected for 5 days and dried in air oven at 70ºc over night, then dried at 105ºc to a constant weight and ground to pass through 1- mm screen sieve.

Chemical analysis:-

Feeds and feces in the first and second experiment were analyzed for dry matter , ash, crude protein, crude fiber, and ether extract (A.O.A.C., 1990) . Nitrogen free extract was calculated by differences. pH value of rumen liquor samples were determined by using pH meter. Ammonia nitrogen in rumen liquor was determined according to Conway (1963) and the TVFAs concentration was determined according to Kromann (1967).

Statistical analysis:-

Data were analyzed statistically using the general linear model procedure of SAS (1986). Significant differences between means were separated by Multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Experimental 1:

Nutritional evaluation:

Data in Table (1) indicated that wilted berseem silage (S1) had the highest content of OM and CF compared with other silages. The highest content of CP was observed in berseem hay (12.50 %) followed by barley-berseem silage (S2) (10.94 %). Also, berseem hay had the highest content of CF followed by S1 being 25.75 and 17.64 %, respectively. While, S3 was the lowest in CF content (11.45%).This variation in the chemical composition among different silages may be due to the variation in its ingredients (Khorasani *et al.*, 1993 and Khalili *et al.*, 2005). Chemical composition of concentrate feed mixture, berseem hay and rice straw was in agreement with that obtained by Abdul Aziz, (2001) and Ali (2005).

Table (1): Chemical composition of the experimental feeds (% DM basis).

Items	CFM	Roughages				
		S1	S2	S3	BH	RS
OM	91.55	93.69	92.90	91.56	87.32	85.18
CP	15.50	8.75	10.94	10.66	12.50	4.05
EE	2.37	2.94	4.91	3.44	3.15	1.67
CF	12.84	17.64	11.87	11.45	25.75	39.67
NFE	60.84	64.36	65.18	66.01	45.92	39.79
Ash	8.45	6.31	7.10	8.44	12.68	14.82

CFM: Concentrate feed mixture S1: Wilted berseem silage
S2: Barely- berseem silage S3: Corn-berseem silage
BH: Berseem hay RS: Rice straw.

Data in Table (2) showed that the best silage characteristics were observed in corn-berseem silage (S3) being 4.20, 7.50% and 3.41% for pH, ammonia nitrogen and lactic acid, respectively. This priority for S3 may be due to its highly content of soluble carbohydrates, as a result of corn presence, which improves ensiling environment. This result agrees with the finding of Broderick *et al.*, (2003) who reported that increasing soluble carbohydrates content during ensiling process improves silage quality. Data in Table (3) showed that the digestion coefficients of all nutrients were significantly improved ($P<0.05$) with corn or barley addition in S2 and S3 compared with S1. The highest digestion values were observed in (S3) compared to the other silages. This result may be due to the low content of crude fiber in S3. Nutritive value as total digestible nutrients (TDN) and digestible crude protein (DCP) were significantly ($P<0.05$) higher with (S3) than other silages. This result may be due to the higher nutrients digestibility in S3. Nitrogen balance (g) was significantly ($P<0.05$) more in (S3) compared with the other silages. This result may be due to the higher crude protein digestibility in S3 (Khalili *et al.*, 2005).

Rumen parameters

There were insignificant ($P<0.05$) differences in rumen pH and VFA among different silages (Table 4). There was insignificant ($P<0.05$) difference in rumen ammonia concentration between (S2) and (S3). While, the lowest significant value of rumen NH_3-N was observed in (S1), being 8.37 mg/100ml RL. This variation in rumen NH_3-N concentration may be due to the higher content of CP in S2 and S3 compared with S1. These results agree with those found by Broderick (1995).

From the previous results in experiment 1, corn-berseem silage seems to be the best silage which can be used in dairy cows rations.

Table (2): Characteristics of the experimental silages.

Items	Experimental silages		
	S1	S2	S3
pH	5.02	4.63	4.20
NH_3-N, % (DM)	10.90	8.50	7.50
Lactic acid, % (DM)	2.33	3.39	3.41

Table (3): Digestion coefficients, nutritive value and nitrogen balance by sheep fed tested silages.

Items	Experimental silage			±SE
	S1	S2	S3	
A) Digestion coefficients, %				
DM	72.85	72.00	75.93	1.45
OM	76.88[a]	73.99[b]	77.80[a]	1.18
CP	52.37[c]	57.05[b]	65.91[a]	0.97
EE	79.05[b]	82.65[a]	81.91[a]	0.69
CF	50.18[b]	67.07[a]	65.17[a]	3.06
NFE	75.28[c]	80.91[b]	81.65[a]	1.04
B) Nutritive value, %				
TDN	70.65[c]	74.16[b]	74.72[a]	0.30
DCP	4.58[c]	6.24[b]	7.03[a]	0.10
C) Nitrogen balance, g				
Nitrogen intake, g/h/d.	8.04	9.15	9.61	-
Fecal nitrogen, g/h/d.	3.82	3.93	3.27	-
Urinary nitrogen, g/h/d.	2.71	3.07	3.36	-
Nitrogen balance, g/h/d.	1.51	2.15	2.98	-

a,b,c.....Means in the same row with different superscript are significantly different (P<0.05).

Table (4): Effect of experimental silages on some rumen parameters of sheep.

Items	Time of sampling	Experimental silage			±SE
		S1	S2	S3	
pH	0	7.01	7.14	7.16	0.90
	2	6.87	6.98	6.98	
	4	7.15	7.18	7.19	
	Mean	7.01	7.10	7.11	
NH_3-N, mg/100 ml RL	0	8.63	9.63	10.03	0.20
	2	10.44	10.53	11.94	
	4	6.05	8.81	9.62	
	Mean	8.37[c]	9.66[b]	10.53[a]	
VFA, mleq/100 ml RL	0	2.38	2.48	2.57	0.45
	2	3.68	3.88	3.33	
	4	1.48	1.71	2.01	
	Mean	2.51	2.70	2.63	

a,b,c.....Means in the same row with different superscript are significantly different (P<0.05).

Experimental 2:

The digestion coefficients of DM, OM, CP,EE,CF and NFE and the nutritive values as TDN and DCP of tested ration (concentrat feed mixture + corn-berseem silage) were significantly (P<0.05) higher than those in the control group by 4.49, 4.48, 15.69, 3.72, 12.45, 7.40, 2.04and 11.69%, respectively (Table 5). These results may be due to the low ash and CF contents in silage ration compared with hay ration. These results were in agreement with those of Broderick (1995).

Table (5): Digestion coefficients and nutritive values of experimental rations by dairy cows.

Items	Experimental rations		±SE
	*C	**S	
A) Digestion coefficients, %			
DM	75.95[b]	79.36[a]	0.08
OM	79.23[b]	82.78[a]	0.64
CP	66.71[b]	77.18[a]	0.14
EE	81.68[b]	84.72[a]	0.01
CF	65.07[b]	73.17[a]	0.01
NFE	81.88[b]	87.94[a]	0.11
B) Nutritive value, %			
TDN	73.89[b]	75.40[a]	0.05
DCP	9.42[b]	10.28[a]	0.02

a,b,c.....Means in the same row with different superscript are significantly different (P<0.05).

*C: Control ration (CFM + BH) **S: Tested ration (CFM + corn- berseem

Performance of lactating cows:

Feed intake:

The total DM intake was slightly higher in the control ration than the tested ration (Table 6). This increase may be due to its low moisture content. These results agree with the findings of Nelson and Satter (992) who reported that DMI was decreased by 2.2 kg/d for lactating cows fed diets containing alfalfa silage compared with those fed alfalfa hay. Also, Beauchemin *et al.*, (1997) mentioned that the DMI was 2.6 kg/d lower for cows fed alfalfa silage than those fed alfalfa hay.

Milk yield, milk composition and feed conversion:-

There was a significant (P<0.05) increase in the average daily milk yield and 4% fat corrected milk (FCM) of lactating cows fed tested ration (22.78 and 19.85 kg/h./d, respectively) compared with those fed control ration (20.80 and 18.30 kg/h./d), as shown in Table (6). This improvement in milk production may be due to the better utilization of nutrients of silage for milk production than the control cows since both groups consumed almost equal amounts of TDN (Table 6). This is confirmed by the better feed conversion of silage. These results agree with the findings of West *et al.*, (1998) who observed that cows fed grass silage ration produced more milk than those fed grass hay ration.

On the other hand, there were no significant (P<0.05) differences between animals fed control or tested rations in fat, protein, total solids and lactose of milk (Table, 6). While, feeding cows on silage ration significantly (P<0.05) increased the cotent of milk from solids non fat and ash by 2.5 and 2.8%, respectively compared with the control. These results agree with Beauchemin *et al.*,(1997) who reported that cows fed alfalfa silage were better in FCM, fat, lactose% and feed conversion (kg Milk / kg DMI) than those fed alfalfa hay. Feeding cows on tested ration improved the feed conversion (kg TDNI/kg FCM) by 7.55 % compared with those fed control ration. This result was confirmed by Nelson and Satter (1992).

Table (6): Effect of the experimental rations on feed intake, feed conversion, milk production and composition of cows.

Items	Experimental rations		±SE
	*C	**S	
A) Dry matter intake, Kg/h/d.			
Concentrate feed mixture	10.00	10.54	---
Berseem hay	6.00	----	---
Berseem silage	----	4.16	---
Rice straw	0.25	1.25	---
Total	16.25	15.95	---
TDN intake, Kg/h/d.	12.00	12.03	---
B) Milk production and composition.			
Milk yield, Kg/h/d.	25.80^{b}	27.78^{a}	1.56
FCM (4 % fat), kg/h/d.	22.70	24.19	0.17
Fat %	3.20	3.14	0.10
Protein %	2.53	2.64	0.11
SNF %	8.00^{b}	8.20^{a}	0.26
TS %	11.19	11.50	0.08
Lactose %	4.76	4.80	0.02
Ash %	0.84^{b}	0.90^{a}	
C) Feed conversion, Intake/production.			
Kg TDN/ kg FCM	0.53	0.49	---
D) Economical evaluation			
Feeding cost (as fed), L.E., h/d.			---
Concentrate feed mixture	12.02	12.67	---
Berseem hay	4.12	-----	---
Berseem silage	-----	2.38	---
Rice straw	0.03	0.15	---
Total	16.17	15.20	---
Feed cost / 1 kg FCM	0.71	0.62	---

a,b,c.....Means in the same row with different superscript are significantly different (P<0.05).

Based on prices at the beginning of the experiment, the prices were as follows: CFM, 1100; BH, 600; berseem silage, 200; rice straw, 100 (L.E. /ton).

Economical Evaluation:-

Data in Table (6) indicated that the feeding cost (as fed) per 1kg FCM was lower for cows fed silage ration (0.62 L.E.) compared with those fed hay ration (0.71 L.E.).

So, from the previous results it can concluded that feeding dairy cows on corn-berseem silage with concentrate may be economically improve milk production efficiency .

REFERENCES

Abdul-Aziz, G.M.; EL- Talty, Y.I. and Ali, M.A. (2001). Calcium hydroxide treatment of some organic wastes. 1- Effect on chemical composition and *in vitro* digestibility. Egyptian J. Nutrition and Feeds, 4 (Special Issue): 403.

Abou –Akkada, A. R. and El - Shazly, k. (1964). Effect of absence of ciliate protozoa from the rumen on microbial activity and growth of lambs. Appl. Microbial., 12: 384.

Ali, M. A. (2005). Effect of probiotic addition on grawth performance of growing lambs fed different roughages. Egyptian J. Nutrition and Feeds, 8 (Special Issue): 567.

A.O.A.C.(1990). Official Methods of Analysis. 15 th Ed . Association of Official Analytical Chemists Washington , DC ., USA .

Beauchemin, K. A; Rode, L . M. and Eliasont M.V. (1997). Chewing activities and milk production of dairy cows fed alfalfa as hay, silage , or dried cubes of hay or silage. J Dairy Sci., 80:324.

Broderick, G.A. (1995).Performance of lactating dairy cows fed either alfalfa silage or alfalfa hay as the sole forage. J Dairy Sci., 78:320.

Broderick, G.A.; Koegel. R.G.; Walgenbach, R.P. and Kraust, T. J. (2003). Ryegrass or alfalfa silage as the dietary forage for lactating dairy cows. J. Dairy Sci., 85:1894.

Conway, E. J . (1963). Microdefiusion analysis and volumetric error , PP. 90. London: Cros by Lock Wood and Son.

Dhiman, T . R. and Satter, L. D. (1997).Yield responses of dairy cows fed different proportions of alfalfa silage and corn silage. J. Dairy Sci., 80:2069.

Duncan , D.B. (1955).Multiple range and multiple F test. Biometrics, 11: 1.

El-Serafi, A.M. (1968).Some nutritional studies on the suitable combination of molasses with certain feeding stuffs. M. Sc. Thesis, Fac. Agric., Cairo University.

Gaines, W.L. (1923).Relation between percentage of fat content and yield of milk. 1-correction of milk yield for fat content. Agric. Exo. Sta. Bull. 245.

Kawashima, T.; Sumamal, W.; Pholsen, P.; Chaithian, R.; Boon pakdee, W. and Shibata, M. (1996). Nutritive value of sugarcane tops for feeding cattle. The 8 th AAAP Animal Sci. Congress Proceedings Vol 2 PP238-239 October 13-18 Tokyo. Japan.

Khalili, H .; Sairanen, A.; Nousianinen, J. and Huhtanen, P. (2005). Effects of silage made from primary or regrowth grass and protein supplementation on dairy cow performance. Livestock Production Science, 96: 269.

Khorasani, G.R.; Okine, E . K.; Kennelly, J. J. and Hel, J. H. (1993). Effect of whole crop cereal grain silage substituted for alfalfa silge on performance of lactating dairy cows. J Dairy Sci., 76:3536.

Kromann , R. P. ; Meyer, J. E. and Stielau, W. J. (1967). Steam distillation of volatile fatty acids in rumen digesta . J. Dairy Sci ., 50 : 73.

West, J.W; Mandebvu, P.; Hill, G.M. and Gates, R.N. (1998). Intake, milk yield and digestion by dairy cows fed diets with increasing fiber content from bremuda grass hay or silage. J. Dairy Sci., 81: 1599.

Ling , E . R . (1963). A Text Book of Dairy Chemistry. 3th Ed., Vol 11 Chapman and Hall, L ., London.

Nelson, W.F. and Satter, L.D. (1992).Impact of stage of maturity and method of preservation of alfalfa on digestion in lactating dairy cows. J. Dairy Sci., 75: 1571.

NRC. (1990). Nutrient Requirements of Dairy Cattle. 7 th Ed., National Academy of Sciences, National Research Council, Washington, D.C.
SAS (1986). SAS Users guide : Version 5 Ed . SAS Institute Inc.,Gary, NC.
Van Keullen , J . and Young , B. A.(1977). Evaluation of acid insoluble ash as a nutural marker in ruminant digestibility studies. J. Animal. Sci., 44: 282.
Waldo, D. R. and Schultz , L. H., (1956). Lactic acid production in the rumen. J. Dairy Sci., 39:1455.

تأثير التغذية على أنواع مختلفة من سيلاج البرسيم على كفاءة الأبقار الحلابة.

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تم فى هذه الدراسة تقييم ٣ أنواع من سيلاج البرسيم. حيث تم تقطيع البرسيم (٣-٥ سم) ثم اما أن يتم تجفيفة شمسيا للحصول على سيلاج البرسيم المذبل (س١) أو ان يتم خلطة بنسبة ٧٥: ٢٥ % مع مجروش الشعير (س٢) أو مجروش الذرة (س٣). تم حفظ السيلاج لمدة ٧٠ يوم بطريقتين، إما داخل أجولة مزدوجة الجدار او داخل سيلو فوق الأرض. وهذه الدراسة تكونت من تجربتين:

١) تقييم جودة السيلاج الناتج وتقدير قيمتة الغذائية عن طريق إجراء تجارب هضم باستخدام ٣ كباش بالغة (٣ ×٣ مربع لاتينى)
٢) المقارنة بين تأثير التغذية على دريس البرسيم وسيلاج البرسيم–ذرة (س٣) على كفاءة إنتاج اللبن وذلك باستخدام ٤ بقرات فريزيان حلابة بواسطة طريقة "عودة الى بدء".

ولقد أشارت النتائج أن أفضل خصائص سيلاج وقيمة غذائية وميزان النيتروجين بواسطة الأغنام تم ملاحظتها فى سيلاج البرسيم – ذرة (س٣) مقارنة بأنواع السيلاج الأخرى وعلى ذلك قورن تأثير سيلاج البرسيم–ذرة (س٣) مع دريس البرسيم على إنتاج اللبن.ووجد أن الأبقار المغذاة على عليقة بها س٣ أنتجت أعلى كمية لبن مقارنة بالأبقار المغذاة على عليقة بها دريس البرسيم (د). لم يكن هناك اختلافات معنوية بين التركيب الكيماوي للبن للأبقار المغذاة على علائق (س٣) أو (د) البرسيم، فيما عدا أنة كانت هناك زيادة معنوية فى محتوى لبن الأبقار المغذاة على عليقة س٣ من الجوامد اللادهنية والرماد. اقل تكلفة لإنتاج اللبن تم ملاحظتها فى مجموعة الأبقار المغذاة على عليقة س٣ (٦٢ قرش/١ كجم لبن معدل نسبة الدهن ٤%) مقارنة بتلك المغذاة على عليقة د (٧١ قرش/١ كجم لبن معدل نسبة الدهن ٤%).

وعلى هذا يمكن استنتاج أن تغذية الأبقار الحلابة على علائق تحتوى على سيلاج (البرسيم – ذرة) ربما يحسن من كفاءة إنتاج اللبن وتقليل تكلفة الإنتاج.