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EFFECT OF REPLACING BERSEEM HAY BY VEGETABLE MARKETING WASTE SILAGE IN THE RATIONS ON SOME PRODUCTIVE AND PHYSIOLOGICAL TRAITS OF LACTATING COWS

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ABSTRACT

Twenty four lactating Friesian cows were divided randomly into four similar groups. Cows of the first group were fed on a control ration (R1) consisted of 50% concentrate mixture (CM), 30% berseem hay (BH) and 20% rice straw (RS), for the other three groups (R2, R3 and R4) 33, 66 and 100% of the berseem hay (BH) were replaced by vegetable marketing waste silage (VMWS), respectively.

Results indicated that the contents of DM, CP, CF and ash decreased, while OM, EE and NFE contents increased with increasing the level of VMWS in rations. The digestion coefficients of DM, OM, EE and NFE (and consequently the TDN value) increased, while the digestion coefficients of CP, CF (and subsequently the DCP value) decreased significantly ($P<0.05$) with increasing the level of VMWS in the rations. Average daily intakes of DM, TDN, CP and DCP decreased significantly as the level of VMWS in the rations increased. Ruminal TVFA's, blood T_3 and cortisol concentrations and alkaline phosphatase activity increased, while ruminal pH value and NH_3-N, and blood total protein, albumin, globulin, urea and creatinine concentrations and activity of GOT and GPT decreased significantly ($P<0.05$) with increasing the level of VMWS in the rations.

The yield of actual milk, 4% fat corrected milk (FCM), fat, lactose and total solids increased significantly ($P<0.05$) with increasing the level of VMWS up to 66% and decreased afterwards. Fat and lactose contents increased, while protein, total solids, solid not fat and ash contents of milk and the yield of milk protein decreased significantly ($P<0.05$) with increasing the level of VMWS in the rations. Yield of solid not fat in milk of cows fed 100% VMWS (R4) was significantly lower ($P<0.05$) compared to those fed R1, R2 and R3 rations..

Daily feed cost decreased, and efficiency of energy and protein utilization as well as feed and economic efficiency increased significantly ($P<0.05$) with increasing the level of VMWS in the rations. The income of 4% FCM yield increased significantly ($P<0.05$) with increasing the level of VMWS up to 66% and decreased afterwards. Blood analysis revealed normal hepatic function and level of hormone associated with energy metabolism.

Keywords: Lactating Friesian cows, vegetable marketing waste silage, digestibility, nutritive values, milk production and composition, blood constituents, rumen liquor parameters.

INTRODUCTION

The livestock sector plays a significant economic role in most developing countries and is essential for the food security of their rural population. However, among the major constrains limiting the development of livestock production in many developing countries in both Africa and Asia, inadequacy of animal feed resources is most often the crucial factor. Feed

shortage, either quantitively or qualitatively, are limiting livestock productivity (Kayouli and Lee, 2002). The available feedstuffs were 63.60 million tons of green forage, 10.80 million tons of concentrate mixture and 12.95 million tons of crop by-product (General Statistics, Year Book, 2002). On one hand, the availabilities of TDN and DCP were 17.60 and 2.25 million tons, respectively. On the other hand, the requirements of TDN and DCP were 23.45 and 3 15 million tons, respectively. The annual deficit of TDN and DCP by the year 2002 were about 5.85 and 0.90 million tons, respectivily. On the same time, the yield of vegetables in Egypt is about 14.13 million tons per year (General Statistics, Year Book, 1998) of which about 3.95 million tons are wasted yearly during marketing. The ensiling of vegetable marketing wastes is a simple and appropriate method of conservation of such wastes and consequently help to reduce the feed shortage mentioned above.

The objective of the present study was to investigate the possibilities and effect of replacing berseem hay at different levels by vegetable marketing waste silage in the rations on milk yield and feed and economic efficiency of lactatind cows.

MATERIALS AND METHODS

The present study was carried out at Sakha Animal Production Research Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture to evaluate the effect of feeding of vegetable marketing waste silage on milk yield and composition. Vegetable marketing waste contained a mixture of heterogeneous materials such as lettuce, carrot, bean, cabbages, tomato, potato etc. collected from vegetable markets at Kafr El-Sheikh city. Vegetable marketing waste silage was made between feed toughs, where 30 cm layer of rice straw spread on the ground as bed to absorb the silage seepage and to prevent contamination with earth. Vegetable waste was mixed with bean straw to adjust moisture content. Sugar cane molasses was added at a level of 3% to vegetable marketing waste (on fresh matter basis) to increase the activity of silage fermentation. The materials was compressed by heavy drum filled with sand, then covered with plastic sheet, hard pressed with 30 cm of soil layer and ensiled for eight weeks.

Twenty four lactating Friesian cows at 6 weeks of lactation with average body weight of 500 kg were divided randomly into four similar groups (6 cows each). The cows in the first group were fed a control ration (R1) consisted of 50% concentrate mixture (CM), 30% berseem hay (BH) and 20% rice straw (RS). In the second (R2), third (R3) and fourth (R4) groups 33, 66 and 100 of the BH were replaced by VMWS, respectively. Concentrate mixture consisted of 30% undecorticated cottonseed cake, 25% wheat bran, 22% yellow corn, 10% rice bran, 5% linseed cake, 5% molasses, 2% limestone and 1% common salt. Concentrate mixture was obtained from El-Salam Feeds Factory, El-Marg, Cattle Assurance Box, Ministry of Agriculture, Egypt. Molasses from Sugar company, El-Hawamdia, Egypt. While, berseem hay and rice straw were brought from the local area, Kafr El-Sheikh, Egypt.

The cows were fed individually to cover the recommended requirements of dairy cows according to NRC (2001) allowances for dairy cattle. Rations were fed at two equal meals at 8 a.m. and 3 p.m. Water was offered to the cows three times daily.

Four digestibility trails were conducted during the feeding trail using 12 cows (3 each) were chosed randomly from the experimental groups to determine nutrients digestion coefficients and nutritive values of the experimental rations. Each digestibility trail consisted of 15 days preliminary period followed by 7 days collection period. During the digestion trails, cows were fed their normal allowances according to the experimental assignment of each group. Acid insoluble ash (AIA) was used as a natural marker (VanKeulen and Young, 1977). Nutrients digestion coefficients were calculated from the equations stated by Schnider and Flatt (1975).

$$\text{DM digestibility (\%)} = 100 - \left[100 X \frac{\text{AIA\% in feed}}{\text{AIA\% in feces}}\right]$$

$$\text{Nutrient digestibility (\%)} = 100 - \left[100 X \frac{\text{AIA\% in feed}}{\text{AIA\% in feces}} X \frac{\text{nutrient \% in feces}}{\text{nutrient \% in feed}}\right]$$

Where AIA was acid soluble ash.

Samples of CM, BH, RS and VMWS were taken at the beginning, middle and end of digestibility trail. Feces samples were taken from the rectum of each cow twice daily with 12 hours apart during the collection period of the digestibility trail. The samples were composted, dried in a forced air oven at 65 ^{0}C for 48 hours and then ground. Representative sampies of feedstuffs and feces were analyzed according to AOAC (1990). Daily milk production was recorded individually and corrected for 4% fat content (FCM) using the formula of Gains (1928) as follows:

4% FCM =[0.4 x milk yield (kg)] + [15 x fat yield (kg)]

Milk samples from consecutive evening and morning milking were taken every week during the experimental period (3 months). Milk fat, protein, lactose and total solids were determined using Milko-Scan (133B. Foss Electric). Milk fat and protein reanalyzed by Garber's and macrokjeldahle methods as described by Ling (1963).

Rumen liquor samples were taken monthly from 3 cows after 3 hours of the morning feeding using stomach tube and filtered through double layers of cheesecloth. The pH value was determined immediately using digital pH meter (Orian 680). The concentration of ammonia-N was determined according to the method of AOAC (1990) and TVFA's according to the method of Warner (1964). Blood samples were taken monthly from the jugular vein of the cows by clean sterile needle into clean dry heparinized glass tubes, centrifuged for 15 minutes at 4000 R.P.M. to obtain plasma, which was analyzed calorimetrically for total protein, albumin, globulin (by the difference), urea, creatinine, alkaline phosphatase, GOT, GPT, T3 and cortisol using commercial diagnostic kits (Test Combination, Pasteur Lap.).

Feed efficiency was calculated as the amounts of DM, TDN, CP and DCP per kg fat corrected milk (FCM). Energy and protein efficiency were calculated using the following equations:

$$\text{Energy efficiency\%} = \frac{\text{TDN requirement for maintenance and milk yield X100}}{\text{TDN intake}}$$

$$\text{Protein efficiency\%} = \frac{\text{Protein requirement for maintenance and milk yield X100}}{\text{Protein intake}}$$

Economic efficiency of milk production was calculated as the ratio between the income of 4% fat corrected milk production and the cost of average daily feed consumed as follows:

$$\text{Economic efficiency} = \frac{\text{Income of 4\% fat corrected milk production}}{\text{Cost of feed consumption}}$$

Where the price of 1 ton was 1000 LE for 4% fat corrected milk, 700 LE for concentrate mixture, 400 LE for berseem hay, 50 LE for rice straw and 60 LE for vegetable marketing waste silage. The data were statistically analyzed using general linear models procedure adapted by SPSS (1999).

RESULTS AND DISCUSSION

Vegetable marketing waste silage (VMWS) was free from mold, must smells green in color, having a firm texture and pH value was 4.15. The concentrations of TVFA's was 2.25%, lactic acid 6.45% (of DM) and ammonia-N 7.60% of total-N. These results indicated a good quality silage as reported by McDonald *et al.*(1995). Chemical composition of feedstuffs and calculated composition of the experimental rations are presented in Table (1).

Table 1: Chemical composition of the tested feedstuffs and experimental rations.

Items	DM %	Composition of DM %					
		OM	CP	CF	EE	NFE	Ash
Feedstuffs							
CM	90.40	91.50	16.25	12.60	3.20	59.45	8.50
BH	88.60	87.10	13.50	22.40	2.60	48.60	12.90
VMWS	20.50	92.50	10.50	19.70	2.80	59.50	7.50
RS	89.20	83.60	2.40	30.50	1.60	49.10	16.40
Experimental rations							
R1 (control)	89.63	88.60	12.65	19.12	2.70	54.13	11.40
R2	67.07	89.14	12.35	18.85	2.72	55.22	10.86
R3	53.60	89.68	12.05	18.58	2.74	56.31	10.32
R4	44.63	90.22	11.75	18.31	2.76	57.40	9.78

The contents of DM, CP, CF and ash were lower, while OM and NFE contents were higher in vegetable marketing waste silage (VMWS) compared with berseem hay (BH). Calculated composition of the experimental rations

showed that DM, CP, CF and ash contents decreased, while OM, EE and NFE contents increased with increasing the level of VMWS in the rations.

Nutrients digestion coefficients and nutritive values by lactating Friesian cows fed the experimental rations are presented in Table (2). The digestion coefficients of DM, OM, EE and NFE and subsequently TDN value increased, while CP and CF digestions and subsequently DCP value decreased significantly ($P<0.05$) with increasing the level of VMWS in the rations. The TDN values of R1, R2, R3 and R4 were 62.86, 63.82, 64.68 and 65.76 %, respectively. The corresponding values of DCP were 8.66, 8.22, 7.76 and 7.34%, respectively. These results are in agreement with those obtained by Gaafar (2001) who found that digestion coefficients of DM, OM, EE and NFE and subsequently TDN value increased, but digestion coefficients of CP and CF and subsequently DCP value decreased with increasing the level of corn silage fed to growing Friesian calves.

Table 2: Nutrients digestion and nutritive values of the experimental rations.

Items	Experimental rations				
	R1	R2	R3	R4	SE
Digestion coefficients %					
DM	66.50^{d}	67.10^{c}	67.70^{b}	68.30^{a}	0.22
OM	68.50^{d}	69.20^{c}	69.80^{b}	70.50^{a}	0.23
CP	68.45^{a}	66.60^{b}	64.40^{c}	62.50^{d}	0.68
CF	61.40^{a}	59.50^{b}	58.10^{c}	56.50^{d}	0.54
EE	70.80^{d}	72.80^{c}	75.10^{b}	77.20^{a}	0.73
NFE	70.50^{d}	72.30^{c}	73.70^{b}	75.40^{a}	0.55
Nutritive values %					
TDN	62.86^{c}	63.82^{bc}	64.68^{ab}	65.76^{a}	0.61
DCP	8.66^{a}	8.22^{ab}	7.76^{bc}	7.34^{c}	0.31

a, b, c and d: Values in the same row with different superscripts differ significantly ($P<0.05$).

Average daily feed intakes by lactating cows fed the experimental rations are illustrated in Table (3). The amounts of CM, BH+VMWS and RS tended to decrease with increasing the of VMWS lin rations. Average daily intakes of DM, TDN, CP and DCP decreased significantly with increasing the level of VMWS in the rations, which were 16.00, 10.05, 2.02 and 1.38 kg for cows fed control ration (R1); 15.60, 9.95, 1.93 and 1.28 kg for R2 (contained 33% VMWS); 15.20, 9.83, 1.83 and 1.18 kg for R3 (contained 66% VMWS) and 14.70, 9.67, 1.73 and 1.08 kg for R4 (contained 100% VMWS), respectively. These results are in agreement with those obtained by Cilliers *et al.*(1998), Gaafar (2001) and Mohsen *et al.*(2001) who found that DM, TDN, CP and DCP intake decreased with increasing the level of corn silage in the rations of growing calves.

Table 3: Average daily feed intake by lactating Friesian cows fed the experimental rations.

Items	Experimental rations				
	R1	R2	R3	R4	SE
	kg / head / day				
Concentrate mixture*	8.00	7.80	7.60	7.35	-
Berseem hay*	4.80	3.12	1.52	-	-
Vegetable waste silage*	-	1.56	3.04	4.41	-
Rice straw*	3.20	3.12	3.04	2.94	-
BH + VMWS*	4.80	4.68	4.56	4.41	-
DM	16.00^{a}	15.60^{b}	15.20^{c}	14.70^{d}	0.18
TDN	10.05^{a}	9.95^{ab}	9.83^{bc}	9.67^{c}	0.07
CP	2.02^{a}	1.93^{ab}	1.83^{bc}	1.73^{c}	0.06
DCP	1.38^{a}	1.28^{ab}	1.18^{bc}	1.08^{c}	0.05

*On OM basis.
a, b, c and d: Values in the same row with different superscripts differ significantly (P<0.05).

Rumen liquor parameters of lactating Friesian cows are (Table 4) revealed that ruminal TVFA's concentration significantly increased, while pH value and NH_3-N concentration decreased (P<0.05) with increasing the level of VMWS in the rations. The depression of ruminal pH value and ammonia-N with accompanying rise in VFA concentration in response to increasing the level of VMWS in the rations may be due to their content of lactic acid (6.45% of DM). These results agreed with those obtained by El-Ready (2000) who reported that concentration of TVFA's increased, while pH value and concentration of NH_3-N decreased in rumen liquor with increasing the levels of corn silage or corn stover silage in the rations of lactating cows. Hungate (1966) stated that rumen microorganisms utilize more NH_3-N when more energy sources are fermented. Russell and Dombrowski (1980) indicated that ruminal VFA production was closely related to ruminal pH, which can be considered as an important regulator of microbial yield.

The concentrations of T_3 and cortisol and the activity of alkaline phosphatase increased, while total protein, albumin, globulin, urea and creatinine concentrations and the activity of GOT and GPT decreased significantly (P<0.05) in blood plasma of the lactating cows with increasing the level of VMWS in the rations (Table 4). The previous results are in accordance with those obtained by Cornelius (1970) and Mahmoud and Mihalka (1978) they found that plasma total protein, albumin and globulin contents increased with increasing dietary protein intake. Mehany (1999) reported that plasma urea and creatinine concentrations and the GOT and GPT activity increased with increasing the content of CP in the ration. In general both the enzymes activities and the hormonal levels fall within the normal levels of the lactating cattle, which means that the hepatic function and the hormonal activities associated with the energy metabolism seem to be not affected by feeding VMWS.

Table 4: Rumen liquor parameters and blood constituents of lactating Friesian cows fed the experimental rations.

Items	Experimental rations				
	R1	R2	R3	R4	SE
Rumen parameters					
pH	6.90^{a}	6.75^{b}	6.45^{c}	6.25^{d}	0.08
TVFA's (meq/100 ml)	15.70^{c}	16.45^{c}	18.10^{b}	19.35^{a}	0.43
NH_3-N (mg/100 ml)	16.95^{a}	15.85^{b}	14.75^{c}	13.35^{d}	0.40
Blood constituents					
Total protein (g/100 ml)	8.70^{a}	8.45^{ab}	8.20^{bc}	7.90^{c}	0.10
Albumin (g/100 ml)	4.45^{a}	4.30^{ab}	4.20^{b}	4.00^{c}	0.05
Globulin (g/100 ml)	4.25^{a}	4.15^{a}	4.00^{b}	3.900^{c}	0.04
Albumin: globulin ratio	1.05^{a}	1.04^{ab}	1.05^{a}	1.02^{b}	0.01
Urea (mg/100 ml)	19.90^{a}	19.15^{b}	18.35^{c}	17.10^{d}	0.31
Creatinine (g/100 ml)	1.30^{a}	1.45^{b}	1.30^{c}	1.15^{d}	0.05
GOT (IU /L)	45.30^{a}	41.75^{b}	38.65^{c}	33.40^{d}	1.32
GPT (IU/L)	25.90^{a}	22.60^{b}	19.25^{c}	17.35^{d}	0.98
Alkaline phosphatase (U/100 ml)	21.85^{c}	22.30^{bc}	23.00^{b}	24.20^{a}	0.29
T_3 (ug / 100 ml)	52.35^{d}	54.40^{c}	56.80^{b}	58.40^{a}	0.71
Cortisol (ug / 100 ml)	9.60^{c}	11.90^{b}	12.95^{a}	13.65^{a}	0.48

a, b, c and d: Values in the same row with different superscripts differ significantly (P<0.05).

Results in Table (5) revealed that the yield of actual milk, 4% fat corrected milk (FCM), fat, lactose and total solids increased significantly (P<0.05) with increasing the level of VMWS up to 66% and decreased afterwards. The concentration of fat and lactose increased, while that of protein, total solids, solid not fat and ash of milk and the yield of protein decreased significantly (P<0.05) with increasing the level of VMWS in the rations. However, the yield of solid not fat was significantly lower (P<0.05) for cows fed 100% VMWS (R4) compared with those fed rations containing BH (R1, R2 and R3). Average daily milk yield of lactating Friesian cows fed R1, R2, R3 and R4 were 15.85, 16.10, 16.50 and 15.95 kg, respectively. The corresponding values of FCM were 14.30, 14.77, 15.39 and 14.99 kg, respectively. These results are within the values obtained by Coulon *et al.*(1997) who stated that dairy cows fed grass silage yielded more milk than those fed hay. El-Ready (2000) indicated that the contents of fat and lactose increased, while protein, total solids, solid not fat and ash contents decreased with increasing the level of corn or corn stover silage in the rations of dairy cows. Church (1991) reported that acetic acid is the major end product of the fermentation of cell wall carbohydrates by rumen microorganisms. The importance of acetic acid in dairy cows nutrition as a major source of energy and a precursor for fat synthesis has been also demonstrated by Church (1991).

Table 5: Average daily milk production and composition of lactating Friesian cows fed the experimental rations.

Items	Experimental rations				
	R1	R2	R3	R4	SE
Milk yield (kg/ day)	15.85^{c}	16.10^{b}	16.50^{a}	15.95^{bc}	0.08
4% FCM (kg/ day)	14.30^{d}	14.77^{c}	15.39^{a}	14.99^{b}	0.12
Milk composition (%)					
Fat	3.35^{c}	3.45^{bc}	3.55^{ab}	3.60^{a}	0.03
Protein	3.40^{a}	3.20^{ab}	3.00^{bc}	2.80^{c}	0.07
Lactose	4.60^{c}	4.70^{bc}	4.80^{ab}	4.95^{a}	0.04
Total solids	12.25^{a}	12.17^{ab}	12.10^{bc}	12.05^{c}	0.04
Solid not fat	8.90^{a}	8.72^{b}	8.55^{c}	8.45^{c}	0.06
Ash	0.90^{a}	0.82^{ab}	0.75^{bc}	0.70^{c}	0.02
Constituents yield					
Fat (g/ day)	530.97^{c}	555.45^{b}	585.75^{a}	574.20^{a}	6.56
Protein (g/ day)	538.90^{a}	515.20^{b}	495.00^{c}	446.60^{d}	10.59
Lactose (g/ day)	729.10^{c}	756.70^{b}	792.00^{a}	789.52^{a}	8.83
Total solids (kg/ day)	1.94^{bc}	1.96^{b}	2.00^{a}	1.92^{c}	0.01
Solid not fat (kg/ day)	1.41^{a}	1.40^{a}	1.41^{a}	1.35^{b}	0.09

a, b, c and d: Values in the same row with different superscripts differ significantly ($P<0.05$).

Feed and economic efficiencies of lactating Friesian cows fed the experimental rations are shown in Table (6). Feed conversion expressed as the amounts of DM, TDN, CP and DCP per kg 4% fat corrected milk (FCM) decreased, while the efficiency of energy and protein utilization and feed efficiency increased significantly ($P<0.05$) with increasing the level of VMWS in the rations. The previous results are in accordance with those obtained by Mahmoud *et al.*(1992) who noticed that the efficiency of energy and protein utilization was higher for lactating cows fed corn silage compared with those fed the control ration. Mohy El-Dien (1998) stated that feeding sugar beet tops silage for dairy cows led to increasing feed efficiency.

Moreover, the income of FCM yield revealed similar trend to the FCM yield, which increased significantly ($P<0.05$) with increasing the level of VMWS up to 66% and then decreased. Moreover, average daily feed cost decreased, while the economic efficiency increased significantly ($P<0.05$) with increasing the level of VMWS in the rations. These results could be attributed to the higher price of BH compared with VMWS (400 VS. 60 LE / ton, respectively). Economic efficiency for lactating cows fed R1, R2, R3 and R4 were 1.67, 1.82, 2.02 and 2.10, respectively. These results are in agreement with those obtained by Bendary *et al.* (2000) who found that feed cost decreased and economic efficiency increased with increasing the level of sugar beet tops silage in the rations of dairy cows.

Table 6: Feed and economic efficiencies of lactating Friesian cows fed the experimental rations.

Items	Experimental rations				
	R1	R2	R3	R4	SE
Feed efficiency					
DM kg/ kg FCM	1.12^{a}	1.06^{ab}	0.99^{b}	0.98^{b}	0.02
TDN kg/ kg FCM	0.70^{a}	0.67^{ab}	0.64^{b}	0.64^{b}	0.01
CP g/ kg FCM	141.26^{a}	130.44^{b}	119.01^{c}	115.23^{c}	4.82
DCP g/ kg FCM	96.50^{a}	86.82^{b}	76.64^{c}	71.98^{d}	4.01
Energy efficiency %	82.59^{c}	84.92^{b}	87.99^{a}	88.39^{a}	0.76
Protein efficiency %	81.68^{d}	87.86^{c}	95.30^{b}	99.19^{a}	2.93
Economic efficiency					
4% FCM income (LE)	14.30^{d}	14.77^{c}	15.39^{a}	14.99^{b}	0.12
Daily feed cost (LE)	8.54^{a}	8.13^{b}	7.63^{c}	7.15^{d}	0.55
Economic efficiency	1.67^{c}	1.82^{b}	2.02^{a}	2.10^{a}	0.19

a, b, c and d: Values in the same row with different superscripts differ significantly ($P<0.05$).

In conclusion, the vegetable marketing waste silage could be used as a source of roughage in the rations of lactating cows especially during summer season under Egyptian conditions. Replacing the berseem hay by 66% of vegetable marketing waste silage obtain the highest milk production. While, the 100% replacement by vegetable marketing waste silage recorded the least feed cost and the highest economic efficiency. Blood analysis declared normal hepatic function and endocrinological axtivities associated with energy metabolism.

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تأثير استبدال دريس البرسيم بسيلاج مخلفات سوق الخضر فى العلائق على بعض الصفات الإنتاجية و الفسيولوجية للأبقار الحلابة

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أجريت هذه الدراسة على ٢٤ بقرة فى [illegible] حلابة وزعت عشوائيا إلى أربعة مجاميع متماثلة. غذيت أبقار المجموعة الأولى على عليقة المقارنة (١) ٥٠% علف مركز + ٣٠% دريس برسيم + ٢٠% قش أرز، غذيت أبقار المجاميع الثانية و الثالثة و الرابعة على العلائق ٢، ٣، ٤ و التى يستبدل فيها ٣٣، ٦٦، ١٠٠ %من دريس البرسيم بسيلاج مخلفات سوق الخضر على التوالى.

تشير النتائج إلى نقص محتوى كل من المادة الجافة و البروتين الخام و الألياف الخام و الرماد و زيادة محتوى المادة العضوية و المستخلص الايثيرى و المستخلص الخالى من الأزوت فى العلائق التجريبية مع زيادة مستوى سيلاج مخلفات سوق الخضر. كما ارتفعت معاملات هضم المادة الجافة و المادة العضوية و المستخاص الايثيرى و المستخلص الخالى من الأزوت و بالتالى محتوى مجموع المركبات الغذائية المهضومة بينما انخفضت معاملات هضم البروتين الخام و الألياف الخام و بالتالى محتوى البروتين الخام المهضوم انخفاضا معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر. كذلك نقص متوسط المأكول اليومى من المادة الجافة و المركبات الغذائية المهضومة و البروتين الخام و البروتين الخام المهضوم معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر فى علائق الأبقار الحلابة.

ارتفع تركيز الأحماض الدهنية الطيارة الكلية بينما انخفضت قيمة درجة الحموضة و تركيز نيتروجين الأمونيا فى سائل الكرش معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر. كذلك يزداد نشاط إنزيم الفوسفاتيز القاعدى و تركيزات هرمونات الغدة الدرقية و الكورتيزول بينما نقص تركيز كل من البروتين الكلى و الألبيومين و الجلوبيولين و اليوريا و الكرياتينين و نشاط إنزيمات وظائف الكبد (GOT & GPT) معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر فى علائق الأبقار الحلابة.

ارتفع إنتاج اللبن الفعلى و اللبن المعدل الدهن (٤%) و الدهن و اللاكتوز و الجوامد الصلبة الكلية بزيادة مستوى سيلاج مخلفات سوق الخضر حتى ٦٦% ثم انخفض بعد ذلك. كذلك ازداد محتوى الدهن و اللاكتوز بينما قل محتوى البروتين و الجوامد الصلبة الكلية و الجوامد الصلبة اللادهنية و الرماد فى اللبن و إنتاج بروتين اللبن معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر فى علائق الأبقار الحلابة. فضلا عن ذلك انخفض إنتاج الجوامد الصلبة اللادهنية فى اللبن معنويا (على مستوى ٠,٠٥) للأبقار المغذاة على العليقة المحتوية على سيلاج مخلفات سوق الخضر (عليقة ٤) بالمقارنة بالأبقار المغذاة على العلائق المحتوية على دريس البرسيم (علائق ١، ٢، ٣).

انخفضت تكلفة التغذية اليومية بينما ازدادت كفاءة الاستفادة من البروتين و الطاقة و الكفاءة الغذائية و الاقتصادية معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر فى علائق الأبقار الحلابة. فضلا عن ذلك ازداد العائد اليومى من اللبن المعدل الدهن ٤% معنويا (على مستوى ٠,٠٥) مع زيادة مستوى سيلاج مخلفات سوق الخضر حتى ٦٦% ثم قل بعد ذلك. نستخلص من هذه الدراسة أنه يمكن الاستفادة من مخلفات سوق الخضر فى تغذية الحيوانات الحلابة خصوصا فى فصل الصيف تحت الظروف المصرية و ذلك بحفظها فى صورة سيلاج. حيث وجد أن استبدال ٦٦% من دريس البرسيم بسيلاج مخلفات سوق الخضر فى علائق الأبقار الحلابة حقق أعلى إنتاجية من اللبن الفعلى و اللبن المعدل الدهن ٤%، بينما حقق معدل الاستبدال ١٠٠% أقل تكلفة تغذية و بالتالى أعلى كفاءة اقتصادية.