

VARIATION ON QUANTITY AND QUALITY OF SOME BERSEEM CULTIVARS (*Trifolium alexandrinum* L.)

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ABSTRACT

Two field trials were carried out in winter season of 1999/2000 and 2000/2001 to study the variation on quality and quantity among different varieties and accessions of berseem (*Trifolium alexandrinum* L.). For quantity aspect, a significant differences in total green and dry yields (ton/fed), were found among varieties and accessions at both the first season, the second season and the combined analysis over the two winter seasons. Serw-1 variety surpassed significantly ($p < 0.05$) all the varieties and accessions in Dry yield (6.064 t/f), protein yield (1.037 t/f), Total digestible nutrient (TDN) yield (3.673 t/f), Digestible crude protein (DCP) yield (0.722 t/f) and Gross Energy (GE) yield (225.209 MJ/f). Accession(1) and accession(4) were the lowest in total Dry yield (4.86 t/f. and 4.89 t/f.), crude protein (CP) yield (0.814 t/f. and 0.832 t/f.), TDN yield (2.95 t/f. and 2.96 t/f.), DCP (0.564 t/f. and 0.583 t/f.) and GE (176.738 MJ/f. and 176.208 MJ/f.).

For quality aspect, Giza-6 and Sakha-4 varieties had the best quality over all entries. Chemical constituents showed that Sakha-4 was the highest in CP% (17.54%) and the lowest Crude Fiber (CF%) (25.02%) which prove that it is the best variety compared with other varieties and accessions. Accession(2) was the lowest in CP% (16.72%) and the highest in CF% (26.49%).

Total digestible nutrient (TDN) for Giza-6 (61.52%), Sakha-4 (61.05%) were the highest over all the other varieties and accessions. Accession(4) was the lowest in TDN (59.91%), Sakha-4 was the highest in DCP (12.32%), while accession(2) was the lowest in DCP (11.57%). However, Helalie variety was higher in GE (3.78 MJ) than accession (5) (3.56) and accession (4) (3.57 MJ).

For quality aspect, cell wall content revealed that Giza-6 variety was the lowest in Neutral detergent Fiber (NDF) (38.98%), Acid detergent Fiber (ADF) (25.86%) and Acid detergent Lignin (ADL) (5.18%), Sakha-4 ranked the second with NDF (39.76%), ADF (27.21%) and ADL (5.33%) while accession(4) recorded the lowest value in quality with NDF (41.46%), ADF (30.38%) and ADL (6.03%).

INTRODUCTION

Egyptian clover (*Trifolium alexandrinum* L.) is a notable important winter forage crop in A.R.E. It is used as animal feed and soil improvement. It is cultivated annually in large scale about 2 million feddans as a main winter crop in the crop rotation. There is a great possibility to improve its quantitatively and qualitatively characters through the breeding programs, since there is a genetic variability presence within the local landraces. Rammah *et al* (1984), evaluated 380 local ecotypes of berseem and found that the green forage yield of some landraces were superior to the standard variety Giza-1. Highly significant variation in dry forage yield among 169 collections of berseem were found (Mikhael, 1987). Awad (1988), reported significant variations among 41 ecotypes of Egyptian clover. Bakheit and Mahdy (1988), studied the variability of 33 local ecotypes of Egyptian clover over two seasons and found that Giza-1 was the highest variety in yield.

Sakha-4 and Giza-15 produced the highest dry matter yield over six new registered cultivars of berseem (Geweifel and Rammah 1990). Significant differences were found among twenty three selected ecotypes in dry yield (Ragab, 1997).

Forage quality is the most important character of feed stuff. Producing and feeding, the highest quality forage possibly increases animal performance, reduces feeding costs, and ultimately results in an increase return on time and money invested in forage production, (Pioneer Forage manual, A nutritional Guide 1990). Quality of berseem clover was reported in some studies (Putnam *et al*, 2000,2001, Abdel Sattar *et al*, 1996, Abdel Halim *et al*, 1993 and Abdel Khabir *et al*, 1989).

This investigation aimed to study the variation on the quantity and quality among several varieties and accessions of berseem and determine the best variety or accession in yield under the environment of Giza Research Station.

MATERIALS AND METHODS

This investigation was conducted at Giza Agricultural Experimental Station, ARC during 1999/2000 and 2000/2001 winter seasons. The main objectives of this investigation were to study variations in quantity and quality among thirteen varieties and accessions of berseem clover (*Trifolium alexandrinum* L.). The studied varieties were: Helalie (var-1), Sakha-4(var-2), Giza-6(var-3), Giza- 15(var4), Gemmiza(var-5) , Sakha-3(var-6) and Serw.1(var-7) and the accessions were: Selected for high green yield(Acc-1), Salt tolerant(Acc-2),Virus tolerant(Acc-3), Drought tolerant(Acc-4), Chile Pop.(Acc-5) and Assiut Pop.(Acc-6) .

A randomized complete block design with three replicates was used in this study. The plot area was 6 m². Seed were broadcasted at the rate of 20 Kg/fed. All plots received 30 kg P₂O₅/fed prior to planting. Planting date was Oct 11th in the first season and Nov.4th in the second season. Four cuts were taken through the growing period of both seasons. Cutting was done when the stand of plots was about 40-50 cm height and the stubble height was about 6 cm from the soil surface. Plant samples were collected from each plot at each cutting, weighed , dried and grounded in a grinding mill to pass through a 1 mm mach. These samples of each cut were analysed in the forage lab at Giza Research Station to determine crude protein (CP), crude fiber (CF), ether extract (EE), Nitrogen free extract (NFE), Ash, Acid detergent Fiber (ADF), Neutral detergent Fiber (NDF) and Acid detergent lignin (ADL) . Dry matter yield (t./f.) was calculated as fresh (t./f.) x dry matter percentage and the average of the 4 cuts was used in the statistical analysis

Protein yield (t./f.) was calculated as dry matter yield (t./f.)x crude protein percentage. Total digestible nutrient (TDN) calculated according to Naga and El Shazly (1971). Digestible crude protein (DCP) calculated according to McDonald *et al* (1978). Gross Energy (GE) with mega Joel was carried out in the Animal Production Institute by Cellen Kamp Ballistic Bomb calorimeter. Obtained data were subjected to statistical analysis using

MSTAT Computer program Ver.4 (1986). Only the combined analysis of the two seasons was used in the presentation and discussion of the characters control the nutritive value

RESULTS AND DISCUSSION

Fresh forage yield

Data Presented in table (1) indicated the presence of significant differences between the tested materials on their forage yield at both tow growing seasons. Serw -1 and Giza- 15 varieties showed the highest fresh yield (50.764 and 50.540 t./f. respectively), where Chile pop.(Acc-5) and the one selected for high green yield (Acc-1)had the lowest values(40.680,40.880 t./f., respectively). This result agree with Sarhan *et al* (1997).

Table (1): Total fresh and dry yields (Ton/fed.) of different varieties and accessions of Egyptian clover in two growing seasons.

Varieties & accessions	First season 1999-2000		Second season 2000-2001		Combind analysis	
	Fresh yield	Dry yield	Fresh yield	Dry yield	Fresh yield	Dry yield
Helalie	42.165 ^{FC}	5.035 ^{DEF}	38.523 ^D	4.742 ^D	40.344 ^{EF}	4.889 ^E
Sakha- 4	46.984 ^{BCD}	5.553 ^C	39.480 ^{BCD}	4.874 ^D	43.232 ^{BCDE}	5.214 ^{CDE}
Giza- 6	44.69 ^{DEF}	6.008 ^B	44.263 ^A	5.402 ^{AB}	44.48 ^{ABCD}	5.705 ^{AB}
Giz- 15	50.540 ^A	6.146 ^{AB}	40.810 ^{ABCD}	5.144 ^{BCD}	45.675 ^{ABC}	5.645 ^{ABC}
Gemmiza	48.84 ^{ABC}	5.402 ^{CDE}	39.573 ^{BCD}	4.828 ^D	44.21 ^{ABCD}	5.115 ^{DE}
Sakh -3	49.868 ^{AB}	6.048 ^{AB}	43.050 ^{ABC}	5.383 ^{ABC}	46.459 ^{AB}	5.715 ^{AB}
Serw- 1	50.764 ^A	6.461 ^A	43.120 ^{ABC}	5.667 ^A	46.942 ^A	6.064 ^A
Acc(1)	40.880 ^C	4.988 ^{EF}	37.683 ^D	4.731 ^D	39.282 ^F	4.860 ^E
Acc(2)	44.165 ^{DEF}	5.377 ^{CDE}	41.160 ^{ABCD}	5.088 ^{BCD}	42.663 ^{CDEF}	5.233 ^{CDE}
Acc(3)	46.256 ^{EFD}	5.526 ^C	40.950 ^{ABCD}	4.906 ^{CD}	43.603 ^{ABCDE}	5.216 ^{CDE}
Acc(4)	43.596 ^{EFG}	4.943 ^F	39.270 ^{CD}	4.852 ^D	41.430 ^{DEF}	4.898 ^E
Acc(5)	40.68 ^{DEF}	5.407 ^{CDE}	43.400 ^{AB}	5.494 ^{AB}	42.04 ^{DEF}	5.451 ^{BCD}
Acc(6)	44.632 ^{DEF}	5.448 ^{CD}	39.923 ^{BCD}	5.143 ^{BCD}	42.278 ^{CDEF}	5.295 ^{BCDE}
Mean	45.69	5.565	40.862	5.096	43.279	5.331
LSD 0.05	3.164	0.420	3.942	0.481	3.450	0.4362

For the second year the data in table(1) show that there was a significant difference between the varieties and accessions ($P < 0.05$). Giza-6 variety and Acc(5) had the highest values (44.263 and 43.400 t/f respectively), whereas both Acc (1) and Helalie variety had the lowest values (37.683 and 38.523 t/f, respectively). The combined analysis for fresh yield (table 1). Showed that Serw-1 variety gave the highest fresh yield (46.942 t./f.), followed by Sakha-3 variety (46.459 t./f.) where Acc (1) had the lowest value (39.282 t/f).

Dry Matter Yield

Data presented in table (1) show the presence of significant differences ($P < 0.05$) on dry matter yield in the first year for all varieties and accessions. Serw-1 variety was superior (6.461 t/f) over all varieties and accessions, Giza-15 and Sakha-3 varieties were ranked the second

(6.146 and 6.048 *tf* for the two varieties, respectively), whereas Acc(4) and Acc(1) had the lowest values (4.943 and 4.988 *tf* respectively).

In the second year there was a significant differences among all materials ($P < 0.05$). Serw-1 variety was superior (5.667 *ton/fed*); Acc(5) and Giza-6 ranked the second (5.494 and 5.402 *tf* respectively), whereas, Acc(1) and Helalie variety had the lowest values (4.731 and 4.742 *tf* respectively). The combined analyses for total Dry matter yield, over the two years indicated that varieties and accessions differed significantly ($P < 0.05$), and showed the superiority of Serw-1 variety (6.064 *tf* followed by Sakha-3 and Giza -6 varieties (5.715 and 5.705 *tf*, respectively), whereas Acc(1), Helalie variety and Acc(4) yielded 4.860, 4.889 and 4.898 *tf*, respectively.

The statistical analysis of the data showed a significant interaction ($P < 0.05$) for total dry matter yield for all varieties and accessions (average over years), which was higher in the first year than in the second year. The reduction of green and dry matter yield in the second year could be due to the difference to the sowing date in both seasons, as the first season was planted at Oct. 11th while the second season was sown at Nov 4th. The planting time was very effective, whereas, planting at Nov 4th delayed the germination, reduced the growth and inhibited the regrowth of shoots after cutting.

In addition, these varieties and accessions were bred under different environmental conditions, therefore they might respond differently to the environmental conditions prevailing during individual growth period and throughout the entire growing season (Abdel Haliem *et al.*, 1993). Differences in dry matter yield in response to varietal variation as well as the significant interaction (variety X year) were evident in other studies (Rammah *et al* 1984, Khareb *et al*, 1986, Shah *et al* 1987, Alison *et al* 1988, Bakhiet & Mahdy, 1988, Kheiralla *et al* 1988, Joost and Chaney, 1988 and Younis *et al* ,1988).

Combined analysis over two years (table 2) indicated that the crude protein yield (CP), Total digestible nutrient (TDN) yield, Digestible crude protein (DCP) yield and gross energy yield (GE) differed significantly among all entries ($P < 0.05$).

Protein yield:

Serw - 1 variety was the superior one (1.037 *tf*) followed by Sakha- 3 (0.968 *tf*). whereas Acc(1) had the lowest value (0.814 *tf*). The differences between Serw 1 variety and other materials ranged between 7.1 to 29.4 percentage.

Total Digestible nutrient (TDN):

Serw-1 variety had the highest TDN value (3.673 *tf*), Giza 6 ranked the second (3.475 *tf*), whereas Helalie var, Acc(1), and Acc(4) had the lowest values (2.943, 2.949 and 2.957 *tf*, respectively) the differences between Serw-1 variety and the rest of entries ranged between 5.7 to 24.8 percentage for TDN yield.

Digestible crude protein yield (DCP):

Serw-1 variety was the superior one (0.722 t/f), Sakha -3 variety ranked the second (0.672 t/f). whereas Helalie and Gemmiza varieties had the lowest values (0.595, 0.595 t/f respectively). The differences between Serw-1 variety and the rest of entries ranged between 7.4 to 21.3 percentage.

Table (2): Combined of two seasons for protein yield , TDN yield, DCP yield and Gross energy yield for different varieties and accessions of berseem clover (*Trifolium alexandrinum* L).

Varieties & accession	Protein yield	TDN yield	DCP yield	Energy yield
Helalie	0.850 ^{DE}	2.943 ^E	0.595 ^F	181.990 ^{DE}
Sakha -4	0.883 ^{BCDE}	3.163 ^{DE}	0.605 ^{CDEF}	192.316 ^{CDE}
Giza -6	0.959 ^{ABC}	3.475 ^{AC}	0.663 ^{ABC}	213.035 ^{AC}
Giz- 15	0.959 ^{ABC}	3.323 ^{BCD}	0.662 ^{BE}	207.381 ^{BC}
Gemmiza	0.862 ^{DE}	3.084 ^{DE}	0.595 ^{DEF}	188.998 ^{DE}
Sakha- 3	0.968 ^{AB}	3.460 ^{ABC}	0.672 ^{AB}	213.609 ^{AB}
Serw- 1	1.037 ^A	3.673 ^A	0.722 ^A	225.240 ^A
Acc(1)	0.814 ^E	2.949 ^E	0.564 ^{EF}	176.738 ^E
Acc(2)	0.903 ^{BCD}	3.150 ^{DE}	0.630 ^{BCD}	193.503 ^{CD}
Acc(3)	0.875 ^{CDE}	3.145 ^{DE}	0.605 ^{CDEF}	190.586 ^{DE}
Acc(4)	0.832 ^{DE}	2.957 ^E	0.583 ^{DEF}	176.208 ^E
Acc(5)	0.904 ^{BCD}	3.304 ^{BCD}	0.626 ^{BCD}	193.587 ^{CD}
Acc(6)	0.887 ^{BCDE}	3.206 ^{CDE}	0.614 ^{BCDE}	185.878 ^{DE}
Mean	0.902	3.218	0.626	195.313
LSD 0.05	0.082	0.260	0.059	16.19

Gross energy yield (GE)

Serw-1 variety ranked the first (225.240 MJ/f) whereas Sakha -3 and Giza 6 varieties ranked the second (213.609 and 213.035 MJ/f respectively). On the other hand, Helalie variety had the lowest value (181.990 MJ/f). The differences between serw-1 variety and the rest of materials ranged between 5.44 to 23.76 percentage. In general, the differences between the entries in the previous characters were due to the differences in dry matter yield as there is positive correlation between dry matter yield, TDN, DCP and GE as indicated in table (3).

Table (3): Correlation coefficients between dry matter yield, total digestible nutrients yield, Protein yield , Gross Energy yield and Digestible crude Protein.

	Dry Yield	TDN Yield	Protein Yield	Energy Yield	DCP Yield
Dry Yield	-	0.872	0.482	0.968	0.956
TDN Yield	-	-	0.564	0.853	0.816
Protein Yield	-	-	-	0.474	0.478
GE yield	-	-	-	-	0.935
DCP yield	-	-	-	-	-

Data presented in table (4) indicate the chemical constituent for different varieties and accessions of berseem clover, it reveals the presence of a range of OM (85.42% - 84.35%), CP (17.54% - 16.72%), CF (26.49% - 25.02%). According to the pervious results, differences between varieties and accessions, indicate that Sakha 4 variety surpassed other entries in quality as it gave the highest CP% (17.54%) and EE 1.94% and the lowest CF% (25.02%) which is in agreement with that obtained by Abdel Khabir *et al* (1989).

Table (4): Chemical constituent on dry matter basis for different varieties and accessions of Egyptian clover (*Trifolium alexandrinum*. L.)

Varieties & accession	OM %	CP %	CF %	EE %	NFE %	ASH %
Helalie	84.58	17.26	25.33	1.73	40.26	15.42
Sakha- 4	84.56	17.54	25.02	1.94	40.07	15.43
Giza -6	85.42	16.81	25.87	1.73	41.01	14.58
Giz -15	84.44	17.13	25.80	1.73	40.21	15.56
Gemmiza	84.62	16.86	26.31	1.71	39.74	15.38
Sakh- 3	84.53	17.24	25.92	1.75	39.62	15.51
Serw -1	84.59	17.47	25.53	1.88	39.71	15.41
Acc(1)	84.65	16.85	25.25	1.74	40.82	15.34
Acc(2)	84.74	16.72	26.49	1.87	39.66	15.26
Acc(3)	84.60	17.02	25.88	1.65	40.05	15.40
Acc(4)	84.35	17.38	25.29	1.72	39.96	15.65
Acc(5)	84.39	17.05	26.33	1.75	39.26	15.61
Acc(6)	84.55	17.05	26.15	1.66	36.69	15.45
Mean	84.62	17.11	25.78	1.76	40.00	15.38

Each mean represents the average of 4 Replications.

Slight differences were found between varieties and accessions in OM, CP, CF, NFE and Ash might be due to the genetic differences among the tested materials, as indicated by Rammah *et al.* (1984). Abdel Halim *et al* (1993) studied the quality of five varieties i.e. Sakha -3, Sakha -4 Giza -6, Giza- 10 and Giza -15 they reported that CP ranged from 17% to 20.1%, CF 18.5% to 22.6%, EE 2.65% to 2.79% and Ash 15.52% to 20%.

Putnam *et al.* (2000 & 2001) studied the quality of Giza 15, Serw -2 , Giza 6, Serw - 1, Giza 10 and Saidie varieties and found that CP ranged from 17% to 19%.

Data presented in table (5) showed the nutritive values of the tested varieties and accessions of berseem clover, the range of TDN was 61.52% - 59.91%, DCP 12.32% - 11.57% and GE 3.782 MJ - 3.520 MJ Accordingly, differences between varieties and accessions for TDN was (2.7%), DCP (6.5%) and GE (7.4%). Regarding the obtained results, it was found that, Giza-6 and Sakha-4 varieties, recorded the highest values (61.52% and 61.05% respectively), while Acc(4) was the lowest (59.91%) for TDN. Sakha 4 variety recorded the highest value (12.32%) for DCP while Acc(2) was the

lowest (11.57%). Also, Helalie variety recorded the highest value for GE (3.782 MJ) while Acc(6) was the lowest (3.520 MJ). The differences among varieties and accessions were due to the high value of OM for Giza-6 than other entries and the highest percentage of crude protein in addition to the lowest value of crude fiber (table 4).

Table (5): Nutritive value (TDN, DCP and GE) for different varieties and accessions of Egyptian clover (*Trifolium alexandrinum* L.)

	Helalie	Sakha 4	Giza 6	Giza 15	Gemmiza	Sakha 3	Serw 1	Acc (1)	Acc (2)	Acc (3)	Acc (4)	Acc (5)	Acc (6)	Mean
TDN%	60.38	61.06	61.52	60.42	60.55	60.39	60.44	60.58	60.37	60.40	59.91	60.38	60.50	60.53
DCP%	12.06	12.32	11.65	11.94	11.70	12.04	12.25	11.69	11.57	11.84	12.17	11.87	11.87	11.91
GE MJ	3.782	3.727	3.724	3.711	3.762	3.763	3.667	3.686	3.777	3.653	3.570	3.566	3.520	3.685

Data in table (6) explain the differences among the tested entries where, Giza- 6 and Sakha -4 varieties surpassed all other materials in quality. They gave the lowest value in NDF(38.98%and39.76%), ADF(25.86 and 27.21%), ADL(5.18%and5.33%), while Acc(4) had the highest value for NDF, ADF and ADL (41.46%, 30.38% and 6.03% respectively). NDF has been shown to be negatively correlated with dry matter intake. ADF is important because it has been shown to be negatively correlated with how digestible a forage may be when fed. When the ADF increases the forage becomes less digestible. ADL, the indigestible non- carbohydrate substance that is the prime factor influencing the digestibility of plant cell- wall materials. As lignin increases digestibility, intake and animal performance usually decrease and the percent of ADF and NDF increase (Pioneer forage manual A nutritional Guide, 1990). This result agree with Putnam *et al* (2000 & 2001) studied quality of Giza 6, Helalie, Gemmiza, Saidi and Serw-3 varieties and concluded that ADF ranged from 27% to 29% and NDF ranged from 36% to 39%.

Table (6): Cell wall content (NDF,ADF and ADL) for different varieties and accessions of Egyptian Clover (*Trifolium alexandrinum* L.)

	Helalie	Sakha 4	Giza 6	Giza 15	Gemmiza	Sakha 3	Serw 1	Acc (1)	Acc (2)	Acc (3)	Acc (4)	Acc (5)	Acc (6)	Mean
NDF%	40.87	39.76	38.98	39.81	40.13	39.98	40.01	40.35	40.88	41.41	41.48	41.24	41.16	40.44
ADF%	28.53	27.21	25.86	28.34	29.17	27.88	29.63	29.19	29.96	29.46	30.38	29.74	29.52	28.84
ADL%	5.75	5.33	5.18	5.82	5.75	5.37	5.87	5.77	5.88	5.59	6.03	5.90	5.57	5.68

In conclusion, taking into account the quantity and quality of all cultivars and accessions under investigation, Serw-1 surpassed other entries in quantity. While Giza -6 and Sakha- 4 were the best entries in quality under environmental conditions of Giza Research Station. This indicates that the best clover variety or accession is the one which have the highest quality of nutritive value and can offer less quantity of feed with high quantity for livestock.

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دراسة الاختلافات الكمية والنوعية في بعض أصناف وعشائر البرسيم المصرى
مصطفى عبد الجواد سيد عبد الجواد
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أجريت تجربتان حقليتان في عامي ١٩٩٩/٢٠٠٠ و ٢٠٠٠/٢٠٠١ بمحطة البحوث الزراعية بالحيزة وذلك لدراسة الاختلافات الكمية والنوعية لـ ١٣ صنف وعشيرة من البرسيم المصرى .

أوضحت أهم النتائج مايلى :

بالنسبة للمحصول:

وجدت فروق معنوية بين الأصناف في السنة الأولى والثانية ومحصول السنيتين معاً، وتفاوت الصنف سرو ١ في محصول المادة الجافة ومحصول البروتين ومحصول المواد الكلية المهضومة ومحصول البروتين المهضوم ومحصول الطاقة الكلية وأعطى (٦,٠٦٤ ، ١,٠٣٧ ، ٣,٦٧٣ ، ٠,٧٢٢ طن/فدان و ٢٢٥,٢٠٩ ميجاجول على الترتيب) بينما كانت العشيرة رقم ١ ورقم ٤ أقل في محصول المادة الجافة (٤,٨٦ و ٤,٨٩ طن/فدان) ومحصول البروتين (٠,٨١٤ و ٠,٨٣٢ طن/فدان) ومحصول المواد الكلية المهضومة (٢,٩٥ و ٢,٩٦ طن/فدان) ومحصول البروتين المهضوم (٠,٥٣٨ و ٠,٥٦٤ طن/فدان) ومحصول الطاقة (١٧٦,٦٣٨ و ١٧٦,٢٠٧ ميجاجول/فدان) .

بالنسبة لصفات الجودة

تفوق الصنفان جيزة ٦ وسخا ٤ وسجلا أعلى قيم لمقاييس صفات الجودة ، بالنسبة للتحليل الكيماوى سجل الصنف سخا ٤ أعلى نسبة من البروتين (١٧,٥٤%) وأقل نسبة للألياف (٢٥,٠٢%) بينما سجلت العشيرة رقم ٢ أقل نسبة في البروتين (١٦,٧٢%) وأعلى نسبة في الألياف (٢٦,٤٩%) وبالنسبة للقيمة الغذائية فقد سجل الصنف جيزة ٦ أعلى نسبة في المواد الكلية المهضومة (٦١,٥٢%) يليه الصنف سخا ٤ (٦١,٠٥%) بينما سجلت العشيرة ٤ أقل نسبة في المواد الكلية المهضومة (٥٩,٩١%) وبالنسبة للبروتين المهضوم فقد سجل الصنف سخا ٤ أعلى نسبة (١٢,٥٤%) بينما سجلت العشيرة رقم ٢ أقل نسبة في البروتين المهضوم (١١,٥٧%) وبالنسبة للطاقة الكلية سجل الصنف هلالى أعلى قيمة (٣,٧٨ ميجاجول) بينما سجلت كل من العشيرتين ٤ ، ٥ (٣,٥٧ ميجاجول). وبالنسبة لمكونات جدار الخلية كان أفضلهم الصنفين جيزة ٦ وسخا ٤ حيث سجلا الألياف المتعادلة (NDF) ٣٨,٩٨% و ٢٩,٧٦% والألياف الحامضية (ADF) ٢٥,٨٦% ، ٢٧,٢١% واللجنين (ADL) ٥,١٨% ، ٥,٣٣% على الترتيب بينما سجلت العشيرة رقم ٤ في الألياف المتعادلة ٤١,٤٦% و الألياف الحامضية ٣٠,٣٨% واللجنين ٦,٠٣% .

أوضحت الدراسة أن الصنف سرو ١ كان الأعلى في الإنتاجية بينما الصنفين جيزة ٦ وسخا ٤ أعلى في صفات الجودة.