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TECHNOLOGICAL STUDIES ON PERFORMANCE OF SOME SUGAR CANE VARIETIES

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ABSTRACT: The present study was carried out to study performance and milling quality of the plant (PC), first (FR), second (SR) and third ratoon (TR) crops of two varieties of sugar cane *i.e.,* Giza 99/103 and Giza 99/160 during period from January to March of 2016/2017 working season. Both varieties were planted under comparable conditions at Kom Ombo Sugar Cane Research Station Farm, Aswan Governorate, Egypt. Results revealed that both varieties gave the highest normal juice extraction average of 79.2% by the onset of January, bagasse (%) cane showed an opposite trend to normal juice extraction whereas G 99/103 and G 99/160 recorded 36.8 and 37.3%, respectively. The highest pol extraction reported for G 99/160 was 93.2 and lower pol (%) bagasse (2.64) compared to 3.15 for Giza 99/103. Sucrose reduction factor of the standard variety G 99/103 showed insignificant variations among the different crops with an average of 0.98 for all the crops and 0.97 with G 99/160 variety. G 99/160 variety had an average varietal correction factor of 0.986. The recorded general average for all crops and test dates for pol (%) cane, estimated recoverable sugars, pol (%) normal juice and normal juice purity for the variety Giza 99/103 were 16.00, 14.75, 18.82 and 88.65; respectively, compared to 14.63, 13.41, 17.50 and 88.2 for Giza 99/160 variety.

Key words: Sugar cane, milling quality, normal juice extraction, bagasse, sucrose reduction factor, juice purity, estimated recoverable sugar.

INTRODUCTION

The cane sugar industry has been started in Egypt since 1868 with six sugar factories. In 1881 the General Company for Sugar and Refining was established. From 1868 till 1956 a number of organization changes have been done. Year 1956 was amalgamation of the two companies the Egyptian Distillery and the sugar Refining Company under the Society Des Sucrenes ET Distillene D' Egypt abbreviated as SSDE due to the growing expansion of the diversification activity the company's name was changed to Sugar and Integrated Industries Company (SIIC). Today, Egyptian Sugar and Integrated Industries Company (ESIIC). ESIIC possess eight sugar factories which are lying in Upper Egypt Governorates. The annual crushing capacity of these sugar factories was more than 10 million tons of cane **(Shweil, 1999)**. Production of good quality white sugar the aim of the economical sugar manufacturing from sugar cane is preservation, extraction and recovery of the maximum yield of sucrose from sugar cane. The steps of raw sugar cane processing are: juice extraction, clarification, evaporation, crystallization, centrifugation, and final drying of the sugar production **(Anon, 1974; Cargill and Winterbach, 1996; Prieto, 1997)**. The Sugar care processing comprised extraction of the juice from the sugar cane sticks using a roller mill apparatus or diffuser apparatus, filtration of the extracted sugar cane juice through a screen filters, stabilization of the pH of the juice in a non-acidic solution of calcium hydroxide, flocculation of the sugar

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cane juice with the mixture of water and natural flocculate product, evaporation of the sugar cane juice concentrate and extraction of the sugar cane from evaporator **(Gonzaies, 2001)**.

The purpose of clarification process is to remove impurities from the juice as early as possible in process. This elimination has to be done to prevent the loss sucrose or reducing sugars in a considerable quantity. The juice usually contains considerable colloidal and fine suspended matters, which are removed by clarification and addition of some soluble compounds, are also done by means of chemical treatment, heating and settling. The concentrated clarified juice resulting from the fourth vessel is called syrup **(Laksameethanasana *et al*., 2012)**. The rate of syrup withdrawal is controlled to give the desired brix value. The operation known in the factory as sugar boiling is essentially the process of crystallization, which is carried in single effect vacuum evaporators designed for handing viscous materials and known as vacuum pans. The vacuum pan is thus an evaporative crystallizer, *i.e.* a crystallizer in which degree of supersaturation is controlled and maintained by evaporating solvent as a solute crystallizes out.

At Kom Ombo sugar factory, the extraction of the juice from cane was done by the milling tandem and diffusion system. In diffusion system the bagasse coming out from the first mill is fed to the diffuser; which is followed by two dewatering mills then the bagasse is subjected to counter current washing with lower concentration juice.

The present study was carried out to study performance and milling quality of the plant (PC), first (FR), second (SR) and third ratoon (TR) crops of two varieties of sugar cane *i.e.,* Giza 99/103 and Giza 99/160 during period from January to March of 2016/2017 working season.

MATERIALS AND METHODS

Materials

Cane sampling for testing varietal performance

The plant (PC), first (FR), second (SR) and third ratoon (TR) crops of the commercially planted cane varieties, Giza 99/103 and Giza 99/160 were used in this study. Both varieties were planted under comparable conditions at Kom Ombo Sugar Cane Research Station Farm, Aswan Governorate, Egypt. Milling tests with cane of both varieties and their crops were conducted periodically, on January, February and March throughout 2016/2017 milling season to investigate their milling qualities. At each test data of five samples from each crop of both varieties were used, exception on March, where the number of samples was 10. Mother samples of 40 kgs each were secured from erect and homogenous cane. Cane stalks were hand stripped and cleaned as described by **Sayed (1972)**. The clean samples were sub-sampled to 30 kgs.

Methods

Performance of cane varieties

The methods adopted to determine the milling qualities for cane varieties was that described by **Legendre and Henderson (1972)** with the following modification:

1. Sample weight was 30 kg clean cane instead of 80 Ib. used by the authors.
2. Three roller hydraulic mills with 10 tons pressure extracted on the top roller were used instead of 3 roller mill with 32 tons pressure on the top roller used by the authors.
3. The samples were milled 6 times instead of 4 by the authors.

Data obtained from the complete milling test were:

1. Crusher juice weight, brix and apparent sucrose.
2. Secondary juice weight, brix and apparent sucrose (the secondary juice is the juice from last three millings and include parts of imbibition water).
3. Bagasse weight, apparent sucrose and fiber (%) bagasse. From these data in the normal juice (juice as it occurs in cane) extraction and sucrose reduction factor (sucrose of normal juice divided by sucrose of crusher juice) were computed in this way:

1- Normal juice brix = crusher juice brix× 0.985 (constant brix reduction factor).

2- Brix product =(crusher juice weight× its brix) + (secondary juice weight× its brix).

3- Normal juice weight = brix product÷ normal juice brix.

4- Normal juice extraction= normal juice weight ÷ weight of cane sample× 100.

5- Sucrose production = (crusher juice weight × its apparent sucrose) + (secondary juice weight × its apparent sucrose).

6- Normal juice purity = sucrose product ÷ product brix.

7- Normal juice sucrose = normal juice purity× normal juice brix.

8- Sucrose reduction factor = normal juice sucrose÷ crusher juice sucrose.

Data obtained from milling test, namely, normal juice extraction pol and brix reduction factors were used to calculate yield per ton of cane according to the method described by **Legendre and Henderson (1972)** this equation is:

$$S96^{o} = S\times \text{ pol factor} - b\times \text{ brix factor}$$

Where:

$S96^{o}$ = is the kg of recoverable 96 pol sugar per ton cane.

S = is the number of 1per cent increments of pol in the crusher juice.

b = the number of 1per cent increments of total solids in crusher juice.

Pol factors= 14.59 × brix reduction factor × juice extraction.

RESULTS AND DISCUSSION

Milling Qualities

The various milling qualities indices for both variety, Giza 99/103 and Giza 99/160, in different crops were evaluated during January to March. The results obtained could be presented as follows.

Normal juice extraction and bagasse (%) cane

Results in Table 1 compare normal juice extraction and bagasse per cent cane in both varieties during the study. Both varieties gave the highest normal juice extraction average of 79.2 by the onset of January, then normal juice extraction remained more or less constant from February to March, without any marked differences among the various crops, except the third ratoon crops of the variety Giza 99/160, which was characterized by slight reduction in normal juice extraction rate through the duration of study. The average normal juice extraction of both varieties was identical in January. During February and March, Giza 99/103 gave somewhat higher normal juice extraction compared to Giza 99/160. It could be stated that normal juice extraction for Giza 99/160 was 78.8% relative to the variety Giza 99/103, as an average for all crops through the duration of study.

Bagasse (%) cane showed an opposite trend to normal juice extraction. The higher the normal juice extraction, the lower the bagasse (%) cane. Bagasse (%) cane showed a slow gradual increase from January to March. However the variety Giza 99/160 having somewhat higher bagasse (%) cane than Giza 99/130 **(Bhatia *et al.*, 2009; Saxena *et al.*, 2010)**.

Pol extraction and pol (%) bagasse

Pol extraction is the amount of sugar extracted in normal juice as percentage of pol contained in cane. Table 2 demonstrates pol extraction and pol (%) final bagasse for the two varieties and their different crops at various test dates. In both varieties, pol extraction increased slightly from January to February, then kept more less constant until March. The variety Giza 99/160 showed somewhat higher pol extraction compared to the variety Giza 99/103. There were no marked differences among the different crops of the two varieties with regard to pol extraction. The increase in pol extraction showed reverse pattern to normal juice extraction, but it was in parallel to sugar cane maturity with attain optimum by the onset of March as reported by **Muir and Eggleston (2009)**.

Changes in pol (%) final bagasse showed a reversible trend to pol extraction. The higher the pol extraction, the lower the pol (%) bagasse. Giza 99/130 variety and its different crops showed higher pol (%) bagasse than Giza 99/160, through the duration of study. The higher pol extraction reported for Giza 99/160

Table 1. Average normal juice extraction and bagasse (%) cane for the varieties Giza 99/103 and Giza 99/160 at different dates

Date of analysis	Crop	Normal juice extraction		Bagasse (%) cane	
		Giza 99/103	Giza 99/160	Giza 99/103	Giza 99/160
Onset of January	Plant crop	80.2	82.3	35.6	32.1
	1st ratton	79.3	78.3	36.1	37.1
	2nd ratton	78.2	78.5	37.8	35.9
	3rd ratton	78.9	77.5	37.2	37.3
Average		79.2	79.2	36.7	35.6
Onset of February	Plant crop	78.0	79.2	38.1	35.1
	1st ratton	78.2	78.3	36.3	35.9
	2nd ratton	79.5	77.0	36.1	38.3
	3rd ratton	78.9	77.2	37.4	38.0
Average		78.7	77.9	37.0	36.8
Onset of March	Plant crop	77.6	75.5	40.0	42.6
	1st ratton	79.7	78.6	35.2	37.3
	2nd ratton	78.6	76.6	37.5	39.6
	3rd ratton	79.4	77.2	34.1	38.9
Average		78.8	77.0	36.7	39.6
General average*		78.9	78.0	36.8	37.3

* The general average is sum mean of 80 determination.

Table 2. Average of pol extraction and pol (%) cane bagasse for the varieties Giza 99/103 and Giza 99/160 at different dates.

Date of analysis	Crop	Pol extraction		Pol (%) bagasse	
		Giza 99/103	Giza 99/160	Giza 99/103	Giza 99/160
January	Plant crop	97.7	94.3	3.33	2.44
	1st ratton	93.1	93.0	2.73	2.32
	2nd ratton	91.3	93.5	3.27	2.42
	3rd ratton	91.8	92.6	3.16	2.65
Average		92.2	93.4	3.12	2.46
February	Plant crop	92.3	94.2	3.57	2.52
	1st ratton	93.8	94.2	2.61	2.15
	2nd ratton	93.8	93.1	2.67	2.64
	3rd ratton	92.9	93.2	3.07	2.71
Average		93.2	93.7	2.98	2.51
March	Plant crop	92.1	91.5	3.50	3.21
	1st ratton	93.1	93.8	3.40	2.51
	2nd ratton	92.7	92.9	3.36	2.93
	3rd ratton	93.5	92.5	3.17	3.21
Average		92.9	92.7	3.36	2.97
General average*		92.8	93.2	3.15	2.64

* The general average is sum mean of 80 determination.

may be attributed to lower pol (%) bagasse (2.64 compared to 3.15 for Giza 99/103) and hence lower sugar losses in bagasse (%) cane. The higher pol (%) bagasse reported with Giza 99/160 may be attributed to its initial higher pol per cent cane.

Sucrose (pol) reduction factor

This factor is used to convert crusher juice sucrose (pol) to normal juice sucrose (pol) as an adjustment in the calculations of theoretical sugar yield. An estimation of sucrose reduction factor for both varieties Giza 99/103 and Giza 99/160 and their different crops at different dates of analysis was done. Results obtained are presented in Table 3. When the milling season begon, *i.e.,* in January, sucrose reduction factor of the standard variety Giza 99/103 showed insignificant variations among the different crops with an average of 0.977 for all the crops. Similar results were obtained during February (average value of 0.981) and on March (0.979) (**Lingle *et al*., 2009)**.

The general average of 80 observations covering all crops and on different dates was 0.979, the same factors showed the same trend in case of the new variety Giza 99/103, with slight variation among the different crops. The general average of 80 observations was 0.972. **Wang *et al*. (2007)** reported that sucrose (pol) reduction factor was varietal character and it equaled to the average of 10 determinations covering the crops of a given variety.

Varietal correction factor

Giza 99/103 was adopted as the standard variety because it is the commercial variety grown in Egypt throughout the last decade. Values of normal juice extraction, sucrose (pol) of brix reduction factors (Tables 1 and 2) were used to calculate sucrose (pol) and brix factors and results were shown in Table 4. As shown in Tables 1 and 3, the cane variety Giza 99/103 had an average normal juice extraction of 78.9, and average sucrose reduction factor of 0.979 and brix reduction factor of 0.985. These milling data led to an average sucrose (pol) and average brix factors of 11.26 and 3.24; respectively. They were adopted as standard for milling quality and together were assigned a value of 1.00, which become the varietal correction factor of standard variety Giza 99/103. Giza 99/160 cane variety is the new substitute to Giza 99/103.

In assigning its varietal correction factors Results in Tables 1 and 3 were used to calculated sucrose (pol) and brix factors of 11.3 and 3.2; respectively obtained for Giza 99/160 variety and sucrose (pol) per cent and brix of crusher juice of this variety in the milling test, kg. of sugar per ton of cane were calculated (designated "1" in Table 5). Again kg of sugar per ton of cane for the same variety were calculated using the same sucrose (pol) per cent and brix of crusher juice as in the first computation but substituting the sucrose and brix factors obtained for the standard variety Giza 99/103 (designated "2" in Table 5). Then the varietal correction for Giza 99/160 variety was obtained by dividing the first calculated kg sugar per ton of cane by the second one. As shown in Table 5, Giza 99/160 variety had an average varietal correction factor of 0.986 (rounded to 0.98). The varietal correction factor assigned to Giza 99/160 variety is an index of its milling quality, expressed as sucrose and brix factors, in relation to that of the variety Giza 99/103 when grown under comparable conditions **(Inman-Bamber *et al.,* 2008).**

Standard sucrose and brix factors for a range of varietal correction factors (0.92 to 1.08) were calculated to facilitate the calculations of estimated recoverable sugar during varietal selection and evaluation programs. These values are presented in Table 6.

Cane and Juice Quality

Results in Tables 7 and 8 show cane and normal juice quality parameters, pol (%) cane, estimated recoverable sugar, pol (%) normal juice and normal juice purity. At the beginning of milling season, early on January, both varieties showed relatively lower pol (%) cane, lower estimated recoverable sugars, lower pol (%) normal juice and lower normal juice purity. One month later, February, these indicated showed marked increase and remained constant thereafter.

Giza 99/103 was superior to Giza 99/160 variety in all the outlined characters except in normal juice purity which was found more or less equal to the Giza 99/160 variety. The recorded

Table 3. Average sucrose reduction factor for Giza 99/103 and Giza 99/160 varieties on different dates

Date of analysis	Crop	Sucrose reduction factor	
		Giza 99/103	Giza 99/160
Onset of January	Plant crop	0.977	0.974
	1st ratton	0.976	0.975
	2nd ratton	0.977	0.977
	3rd ratton	0.978	0.978
Average		**0.977**	**0.976**
Onset of February	Plant crop	0.981	0.981
	1st ratton	0.982	0.978
	2nd ratton	0.979	0.979
	3rd ratton	0.981	0.980
Average		**0.981**	**0.980**
Onset of March	Plant crop	0.979	0.977
	1st ratton	0.979	0.980
	2nd ratton	0.979	0.978
	3rd ratton	0.979	0.979
Average		**0.979**	**0.979**
General average*		**0.979**	**0.978**

Table 4. Average of sucrose factor, brix factors, estimated recoverable sugar and Varietal correction factor for the variety Giza 99/103

Date of analysis	Crop	Sucrose factor	Brix factor	Estimated recoverable sugar	Varietal correction factor
Onset of January	Plant crop	11.43	3.29	150.29	1.000
	1st ratton	11.29	3.26	128.74	1.000
	2nd ratton	11.15	3.21	128.08	1.000
	3rd ratton	11.25	3.23	129.14	1.000
Average		11.28	3.25	134.06	1.000
Onset of February	Plant crop	11.16	3.20	161.62	1.000
	1st ratton	11.20	3.21	145.51	1.000
	2nd ratton	11.35	3.26	140.58	1.000
	3rd ratton	11.29	3.24	148.23	1.000
Average		11.25	3.23	148.99	1.000
Onset of March	Plant crop	11.08	3.19	162.44	1.000
	1st ratton	11.38	3.27	159.40	1.000
	2nd ratton	11.23	3.21	157.35	1.000
	3rd ratton	11.34	3.26	157.68	1.000
Average		11.26	3.23	158.72	1.000
General average*		11.26	3.24	147.26	1.000

* The general average is sum mean of 80 determination.

Table 5. Average of sucrose, brix factors, estimated recoverable sugar(1), estimated recoverable sugar(2)

Date of analysis	Crop	Sucrose factor	Brix factor	Estimated recoverable sugar (1)	Estimated recoverable sugar (2)	Varietal correction factor
Onset of January	Plant crop	11.69	3.38	130.89	131.46	0.996
	1st ratton	11.14	3.21	109.83	111.27	0.987
	2nd ratton	11.19	3.22	121.52	121.14	1.003
	3rd ratton	11.06	3.18	117.75	118.46	0.994
Average		11.27	3.25	120.00	120.58	0.995
Onset of February	Plant crop	11.33	3.25	146.15	144.00	1.015
	1st ratton	11.17	3.21	123.88	124.37	0.996
	2nd ratton	11.00	3.16	134.17	138.52	0.969
	3rd ratton	11.04	3.17	139.09	142.26	0.978
Average		11.14	3.20	135.82	137.29	0.989
Onset of March	Plant crop	10.76	3.10	146.69	150.99	0.971
	1st ratton	11.24	3.23	139.47	141.20	0.988
	2nd ratton	10.93	3.15	145.87	150.00	0.927
	3rd ratton	11.03	3.17	156.08	160.44	0.973
Average		10.99	3.16	147.03	150.66	0.976
General average		11.13	3.20	134.28	136.18	0.986

(1) Calculated using sucrose and brix factors obtained from varietal test.
(2) Calculated using sucrose and brix factors of the standard variety.

Table 6. Standard sucrose (pol) and brix factor corresponding to different values of varietal correction factor

Varietal correction factor	Sucrose (pol) factor	Brix factor
0.92	10.36	2.98
0.94	10.58	3.04
0.96	10.81	3.11
0.98	11.03	3.17
1.00	11.26	3.24
1.02	11.48	3.30
1.04	11.71	3.37
1.06	11.93	3.43
1.08	12.16	3.50

Table 7. Average of cane and juice quality parameters of Giza 99/103 cane variety

Date of analysis	Crop	Normal juice purity	Pol (%) normal juice	Estimated recoverable sugar (%) cane	Pol (%) cane	Age of cane (month)
January	Plant crop	89.0	18.92	15.30	16.36	11
	1st ratton	86.7	16.61	12.87	14.16	8
	2nd ratton	86.4	16.75	12.81	14.33	9
	3rd ratton	85.3	16.75	12.91	14.39	8
Average		86.9	17.22	13.47	14.81	
February	Plant crop	80.9	20.72	16.16	17.52	12
	1st ratton	89.4	18.41	14.55	15.34	9
	2nd ratton	87.6	18.00	14.05	15.27	10
	3rd ratton	89.1	18.80	14.82	15.98	9
Average		89.3	18.98	14.90	16.03	
March	Plant crop	90.6	20.96	16.24	17.66	13
	1st ratton	89.9	20.12	15.94	17.23	10
	2nd ratton	85.4	20.08	15.73	17.03	11
	3rd ratton	89.5	19.75	15.57	16.76	10
Average		89.9	20.23	15.87	17.17	
General average		88.65	18.82	14.75	16.00	

Table 8. Average of cane and juice quality parameters of Giza 99/160 cane variety

Date of analysis	Crop	Normal juice purity	Pol (%) normal juice	Estimated recoverable sugar (%) cane	Pol (%) cane	Age of cane (month)
January	Plant crop	87.8	16.02	13.09	13.97	11
	1st ratton	84.2	14.55	10.98	12.25	8
	2nd ratton	87.1	15.80	12.15	13.27	9
	3rd ratton	85.7	15.62	11.78	13.66	8
Average		86.2	15.50	12.00	13.14	
February	Plant crop	89.9	18.55	14.62	15.58	12
	1st ratton	87.8	16.07	12.39	13.35	9
	2nd ratton	88.5	17.64	13.42	14.59	10
	3rd ratton	88.6	18.22	13.91	15.10	9
Average		88.7	17.62	13.59	14.66	
March	Plant crop	89.7	19.53	14.67	16.11	13
	1st ratton	88.7	17.95	13.65	15.64	16
	2nd ratton	89.7	19.96	14.59	16.45	11
	3rd ratton	91.0	20.12	15.61	16.77	16
Average		89.8	19.34	14.63	16.69	
General average		88.2	17.50	13.41	14.63	

general average for all crops and test dates for pol (%) cane, estimated recoverable sugars, pol (%) normal juice and normal juice purity for the variety Giza 99/103 were 16.00, 14.75, 18.82 and 88.65, respectively, compared to 14.63, 13.41, 17.50 and 88.2 for Giza 99/160 variety. These results are conformed by those of **Kennedy (2005)** who stated that the maturity phase, beginning on March was marked by progress arise in sucrose storage. Its also added that Giza 99/103 was superior to Giza 99/160 with respect to their sucrose content, and that Giza 99/103 was an early maturing variety followed by Giza 99/160.

Within the different crops of each variety, as shown in Tables 6 and 7, the plant crops were higher in all the quality parameters outlined before. Such result disagree with the findings of **(Gravois and Bischoff, 2008; Tew *et al.*, 2009)**. However, this could be attributed to variations in the age of each crop at test times. At all dates of analysis, plant crop was 1 to 2 months older than ratoon crops, which many explain the high quality of plant crop over ratoon recorded in this study.

Conclusion

Giza 99/130 variety and its different crops showed higher pol (%) bagasse than Giza 99/160, through the duration of study. Giza 99/103 was superior to Giza 99/160 variety in all the outlined characters except in normal juice purity which was found more or less equal to the Giza 99/160 variety. Giza 99/103 was superior to Giza 99/160 with respect to their sucrose content, and that Giza 99/103 was an early maturing variety followed by Giza 99/160.

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دراســـات تكنـولــوجيـــة عـن ســـلوك بعـض أصنـــاف قصـــب الســـكر

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تم عمل هذا البحث لدراسة سلوك وجودة إستخلاص السكر من محصول الغرس والخلفات الأولى والثانية والثالثة لصنفين من قصب السكر هما جيزة ١٠٣/٩٩ وجيزة ١٦٠/٩٩ فى الفترة من يناير إلى مارس خلال موسم إستخلاص ٢٠١٦/ ٢٠١٧م، وتم زراعة صنفى القصب تحت ظروف محطة أبحاث قصب السكر بكوم امبو محافظة أسوان، مصر، ومن النتائج المتحصل عليها تبين أن اعلى متوسط نسبة إستخلاص للعصير الطبيعى فى أول يناير كانت ٧٩,٢ %، والنسبة المئوية للباجاس فى القصب كانت عكسية بالنسبة لمعدل إستخلاص العصير حيث سجل الصنف جيزة ١٠٣/٩٩ وجيزة ١٦٠/٩٩ نسبة باجاس (%) قصب قدرها ٣٦,٨ و ٧٣,٣% على التوالى، وكان الصنف جيزة ١٦٠/٩٩ الأعلى فى معدل إستخلاص السكر (٩٣,٢) والأقل فى نسبة السكر فى الباجاس (٢,٦٤) مقارنة ب ٣,١٥ للصنف جيزة ١٠٣/٩٩، وقد أظهر معامل إختزال السكروز للصنف جيزة ١٠٣/٩٩ إختلافات غير معنوية على مستوى محصول الغرس والخلفات المختلفة بمتوسط ٠,٩٨ و ٠,٩٧ للصنف جيزة ١٦٠/٩٩، ومتوسط معامل تصحيح الاصناف للصنف جيزة ١٦٠/٩٩ هو ٠,٩٨٦، وسجل المتوسط العام لمحصول الغرس والخلفات خلال فترة التقدير المختلفة لنسبة الحلاوة (%) القصب، السكر الناتج حسابيا، نسبة الحلاوة فى العصير الطبيعى و نقاوة العصير الطبيعى للصنف جيزة ١٠٣/٩٩ سجلت ١٦,٠٠، ١٤,٧٥، ١٨,٨٢ و ٨٨,٨٥ على التوالى. مقارنة ب١٤,٦٣ ، ١٣,٤١، ١٧,٥٠ و ٨٨,٢٢ للصنف جيزة ١٦٠/٩٩.

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