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Evaluation and Selection of Some Date Palm Seedlings (Phoenix dactylifera L.) Growing under Sohag Region Conditions.

A. O. Rayan
Fruit and Ornamental Breeding Department, Horticultural Research Institute, Agricultural Research Centre, Cairo, Egypt.

THIS STUDY was conducted to evaluate ten seedlings of Date palm (R) (*Phoenix dactylifera* L.) to select the highest yield and fruit quality of the unknown semi-dry seedlings trees growing under the conditions of Sohag region, Egypt, in comparison with the commercial cv. Seewy during two successive seasons (2011 and 2012). Data of yield per palm (kg) as well as physical and chemical properties of fruit were recorded. The results revealed that; Highest yield was obtained from R_3 (127.55 kg/palm) in comparison with other tested, as well as Seewy cv. which produced lowest yield (101.11 kg/palm). Concerning physical properties, R_3 showed that the highest values of physical properties fruit diameter 2.83cm, fruit length 5.06cm, pulp thickness 0.92cm, fruit weight 19.44g., Seed weight 1.59g., pulp weight 85.31% in comparison with other tested and Seewy cv. was 2.07, 4.45, 0.81, 17.19, 1.58, 78.86 respectively. As for chemical properties, R_3 developed the highest values of T.S.S 41.62%, total acidity 1.52%, total sugars content 83.67%, reducing sugars content 44.05%, non-Reducing sugars content 39.62%. the seedlings (R_3) had lower tannins content 1.74%, while the highest tannins percentage was recorded for $R_{5,\ 6,\ 7}$ was 1.86% in comparison with other tested palms as well as Seewy cv. T.S.S 39.64%, total acidity 1.58%, total sugar content 71.96%, reducing sugars content 37.00%, non-Reducing sugars content 30.16%, tannins 1.82% respectively.

General evaluation revealed that R_3 date palm seedlings provide to be the superior in yield and fruit quality among all the studied trees.

Keywords: Evaluation, Date palm seedlings, Yield, Fruit quality.

Date palm (*phoenix dectylifera* L.) is one of the most important fruit crop in Egypt. According to F.A.O. (2009), the number of fruitful female palms was about 12 million, producing about 1270478 tons of fruits**.**

Egypt is considered to be one of the major date producing countries in the world. Date palm is grown in Egypt in both Nile Valley and desert districts. About two hundred different date cultivar are known, of these only a few have been so for investigated for their physical and chemical characteristics (Ragab

et al., 1956, Selim *et al*., 1968, Abd-El-Rahman 1974, Mousa, 1981 & 1985, Hussein *et al*., 1984 and Abdullah & Nady, 2009).

Date palm cultivars divided into three main groups according to its fruit moisture content, *I.e.* Soft. Semi – dry and dry cultivars. Date palm is the national crop in Sohag, Egypt has been widely planted in the country for a long time and so there are many valuable genetic resources. The selection of fruit trees is considered one of the important methods for improving fruit cultivars (Rokba *et al*., 1990).

The production of the date palms by seeds is considered an easy and cheap way of propagation. As a result of the sexual reproduction some of the seedling date palms are highly desirable for fruit quality.

The present investigation was aimed to survey and select the high fruit quality of unknown date palm seedlings, grown under the conditions of Sohag region.

Material and Methods

This study was carried out at Sohag governorate in two successive seasons (2011 and 2012). To evaluate ten of seedlings clones of date palm (R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9 and R_{10}) about 15 years old grown at Sohag governorate. The experimental palms were healthy, nearly uniform in growth, vigor, height and fruiting capacity in the preceding years. The trees were subjected to the normal cultural practices. The total number of surveyed date palm seedling reached fifty seedlings trees. The chosen palms are of semi-dry date fruits. The chosen ten seedlings trees were evaluated, for the following indices were studied and recorded: yield per palm, physical and chemical fruits characters. Seewy cv. standard for semi-dry date palm fruits was also studied.

The following parameters were studied and recorded:

Yield components

Yield per palm (kg)

Fruit physical properties

- Samples of 100 fruits /palm were taken at random for the following determinations:
- 2.1-Fruit diameter (cm)
- 2.2-Fruit length (cm)
- 2.3-pulp thickness (cm)
- 2.4-Fruit weight (g.)
- 2.5-Seed weight (g.)
- 4.6-pulp weight %

Fruit chemical properties

Juice was used for determination of T.S.S. percentage as g/ 100g F.wt. Using hand refractometer according to Chen and Mellenthin (1981).

Total acidity percentage (expressed as g. malic acid/100g. pulp) was determined (A.O.A.C., 1985).

Sugars (total) and reducing sugar content were determined according to Lane and Eynon proceduse as pointed out in (A.O.A.C., 1985).

Tannins content was determined using procedure made by A.O.A.C. (1970). The final evaluation of any tested tree fruit was calculated on the basis of 100 units which were shared between palm yield (50 units) and fruit quality (50 units) Hussein *et al*. (1982). The latter units were divided on the basis of 10 units for each of fruit weight, pulp %, T.S.S and total sugars percent and 5 units for the percent of both acidity and tannins. Each palm that had the best results in any character took the full mark specified for this character, while each of the other tested palms took lower units equal to their quality. For instance if palm no. 3 produced the highest yield it will be given all the 50 units specified for this character accordingly by units of any other tested palm for the same character could be calculated as follows:

$$\frac{\text{yield per palm of tested palm X50}}{\text{yield of palm no. 3}}$$

Similarly, units for any concerned character were calculated in the same way.

Statistical analyses

The obtained data during the study were statistically analyzed by the randomized complete design. Using the MSTAT-C (1990) software for comparison of the mean values by L.S.D. test at the 0.05 level response equations were calculated according to (Snedecor and Cochran, 1988).

Results and Discussions

Yield components

From data of yield per palm given in Table 1 it is appeared that highest yield was 0btaned by R_3 date palm seedlings (127.55kg) followed in a descending order the average yield (116.39, 115.54, 114.37, 113.82, 113.10, 111.73, 111.42, 109.98, 109.72 kg, for R_1, R8, R4, R5, R2, R10, R9, R7, R6 respectively) compared to Seewy cv average (101.11kg) of the two seasons. The results are in agreement with those reported by Mousa (1981), Moustafa *et al.* (1986) Salem & Hamdy (1993), Ahmed *et al*. (1996) and Abdullah & Nady (2009).

Fruit characteristics

Physical fruit properties

Results in Table 1 indicated significant differences in fruit diameter, fruit length, pulp thickness, fruit weight, seed weight, pulp weight in two seasons between the tested verities and Sewy cv.

TABLE 1. Yield and fruit physical properties of selected date palms grown in Sohage governorate During (2011/2012) seasons.

Selected Palms	Yield weight (kg) palm			Fruit diameter (cm)			Fruit length (cm)			Pulp thickness (cm)			Fruit weight (g..)			Seed weight (g..)			Pulp weight (%)		
	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.	2012	2011	Avg.	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.
R1	114.20	118.58	116.39	2.25	2.75	2.50	4.31	4.22	4.27	0.78	0.83	0.81	17.64	18.31	17.98	1.63	1.78	1.71	75.98	81.05	78.52
R2	108.99	117.10	113.10	2.35	2.67	2.51	4.30	4.23	4.27	0.81	0.84	0.83	18.26	18.28	18.27	1.60	1.64	1.62	77.51	81.21	79.36
R3	127.40	127.70	127.55	2.82	2.84	2.83	5.10	5.01	5.06	0.91	0.93	0.92	19.25	19.63	19.44	1.41	1.77	1.59	85.59	85.02	85.31
R4	119.20	109.53	114.37	2.17	2.18	2.18	4.26	4.21	4.17	0.84	0.80	0.82	17.24	17.27	17.26	1.51	1.69	1.60	75.54	80.21	77.88
R5	114.01	113.65	113.82	2.44	2.27	2.36	4.31	4.33	4.32	0.85	0.83	0.84	17.72	17.70	17.71	1.71	1.78	1.75	79.04	81.59	80.32
R6	105.79	113.65	109.72	2.39	2.29	2.34	4.19	4.15	4.17	0.81	0.82	0.82	17.71	17.29	17.50	1.60	1.73	1.67	76.93	80.52	78.73
R7	109.44	110.52	109.98	2.57	2.20	2.39	4.33	4.37	4.35	0.82	0.81	0.82	17.59	17.61	17.60	1.81	1.93	1.87	77.51	80.19	78.85
R8	109.08	122.00	115.54	2.07	2.15	2.11	4.72	4.60	4.66	0.86	0.80	0.83	18.25	18.16	18.21	1.74	1.68	1.71	80.56	83.66	82.11
R9	117.59	105.25	111.42	2.17	2.17	2.17	4.69	4.66	4.68	0.80	0.83	0.82	18.67	18.67	18.67	1.81	1.71	1.76	78.97	81.54	80.26
R10	122.00	101.46	111.73	2.17	2.17	2.17	4.59	4.71	4.65	0.79	0.79	0.79	17.24	17.29	17.27	1.77	1.72	1.75	83.42	80.19	81.81
Seewy	100.17	102.05	101.11	2.09	2.04	2.07	4.48	4.42	4.45	0.81	0.81	0.81	17.15	17.22	17.19	1.53	1.63	1.58	77.91	79.81	78.86
L.S.D at 0.5%	NS	NS	-	0.09	0.07	-	0.11	0.17	-	0.04	0.04	-	0.39	0.23	-	0.22	0.10	-	5.32	1.48	-

The mean of parameter in the column should be labeled with small or capital letter to show their significance whether there is or not!

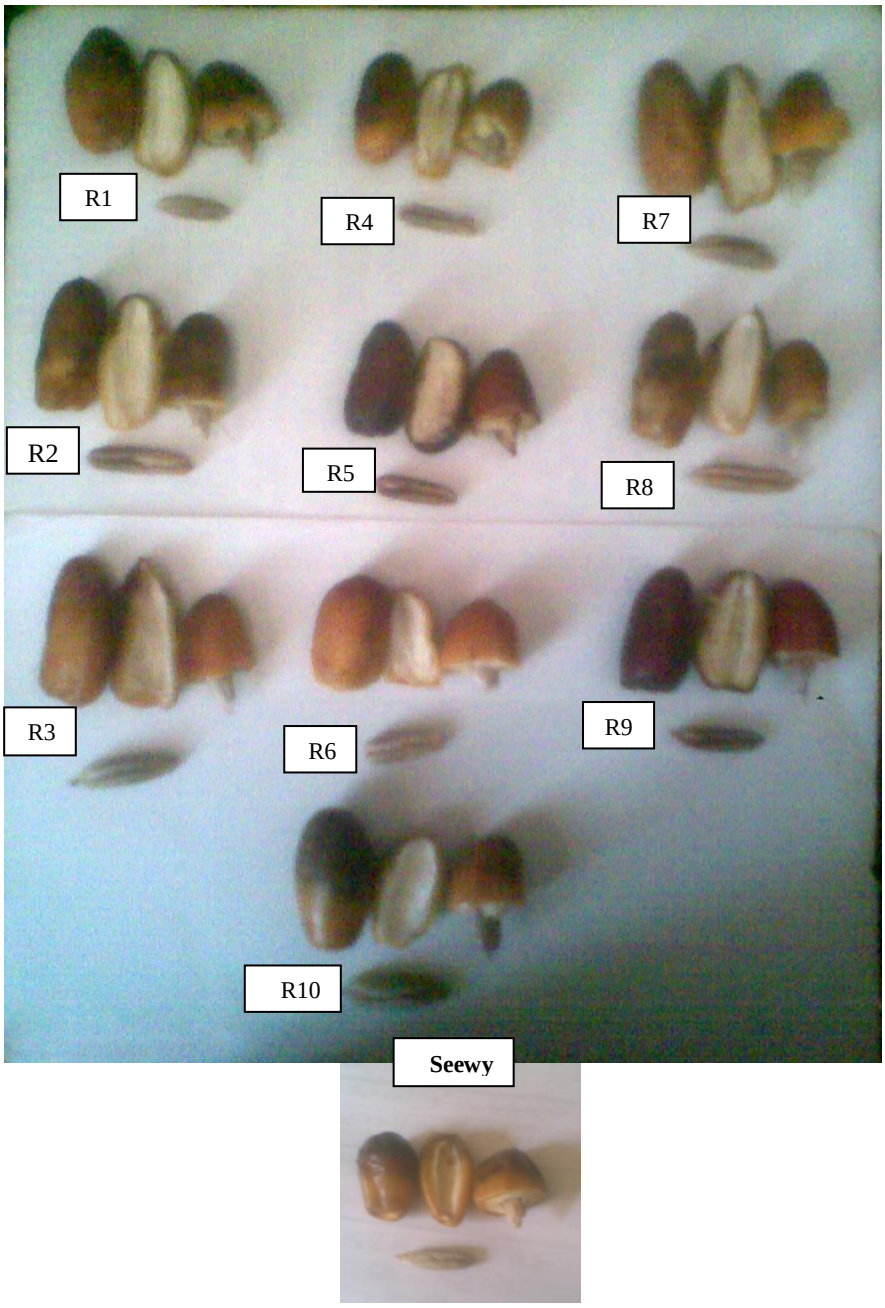

Fig. 1. The morphological charactarestics for ten date palm seedling tree .

The average values for the two seasons show that fruit diameter was highest in R_3 date palm seedlings (2.83cm) followed in a descending order by R_2 2.51, R_1 2.50, R_7 2.39, R_5 2.36, R_6 2.34, R_4 2.18, R_{10} 2.17, R_9 2.17 and Seewy cv 2.07 cm. R_3 fruit length gave (5.06 cm) followed in a descending order by R_9 4.68, R_8 4.66, R_{10} 4.65, R_7 4.35, R_5 4.32, R_2 4.27, R_1 4.27, R_4 4.17, R_6 4.17 and Seewy cv. was 4.45 cm.

On the other hand pulp thickness of (R3) date palm seedling (0.92cm) followed in ascending order by R_{10} 0.79, R_1 0.81, $R_4$0.82, R_6 0.82, R_7 0.82, R_9 0.82, R_8 0.83, R_2 0.83, R_5. 0.84cm as compared to Seewy cv. average (0.81 cm). Selim *et al*. (1968), Abdalla (1980) and Abo Rekab and El-Kerdany (2008), found that pulp thickness varies according to cultivar. The data also reveal that fruit weight was highest in R3 date palm seedling (19.44 g.), followed in descending order by R_9 18.67, R_2 18.27, R_8 18.21, R_1 17.98, R_5 17.71, R_7 17.60, R_6 17.50, R_{10} 17.27 and R_4 17.26, as compared to Seewy cv. 17.19g.

The data also showed that seed weight in R3 average in the two seasons was 1.59g. followed in ascending order by R_9 1.76, R_6 1.67, R_{10} 1.75, R_5 1.75, R_1 1.71, R_8 1.71, R_2 1.62, R_4 1.60, and R_7 1.87g. as compared to Seewy cv. 1.58g.. The pulp weight average 85.31% in (R_3) followed by R_8 82.11, R_{10} 81.81, R_5 80.32, R_9 80.26, R_2 79.36, R_7 78.85, R_6 78.73, R_1 78.52 and R_4 77.88 % as compared to Seewy cv. was average 78.86%. These findings are in harmony with those obtained by Hussin *et al*. (1975), Salem & Hamdy (1993), Ahmed *et al*. (1996), Said-Shren (1999) and Abdullah & Nady (2009).

Chemical fruit properties

Chemical constituents of fruits. *i.e.* Total soluble solids (T.S.S), total acidity, total sugars content, reducing sugars content, non-Reducing sugars content and tannins for semi dry date palm seedlings as well as Seewy cv cultivar are presented in Table 2. Total soluble solids date palm seedlings R_3 is higher significant by (41.62%) followed in a descending order by R_7 40.59, R_6 40.50, R_4 40.41, R_5 40.31, R_1 40.18, R_2 40.00, R_{10} 39.86, R_9 39.84, R_8 39.74 and as compared with Seewy c.v (39.64%).

Data also reveal that the lowest value for total acidity1.52% was found in fruit palm R_3 followed by R_2 1.62, $R_1$1.61, R_9 1.61, R_6 1.60, R_8 1.60, R_{10} 1.60, R_5 1.59, $R_7$1.59 and R_4 1.58 compared with Seewy cv was 1.58%.

The total sugars was 83.67**%**in fruit palm R_3 followed by 78.31, 77.38, 77.25, 77.18, 77.15, 75.65, 75.36, 75.20, 75.00 for palms R_{10}, R_8, R_1, R_9, R_4,R_7, R_2, R_6, R_5, respectively. However Seewy fruits recorded 71.96% in this respect. Hussien and Samiraea (1976) reported that total sugars content in Barhi dates was 83.19 % (on dry weight basis). Sourial *et al*. (1983) found that total sugars content of Hallawy, sayer and Barhi fruits were 31.28, 26.68 and 24.95%, respectively (fresh weight basis).

TABLE 2. Fruit chemical properties of selected date palms grown in Sohage governorate during (2011/2012) seasons .

Selected Palms	T.S.S %			Total acidity %			Total sugar content %			Reducing sugars content %			Non Reducing sugars content %			Tannins		
	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.	2011	2012	Avg.
R1	40.54	39.82	40.18	1.63	1.59	1.61	77.46	77.03	77.25	40.35	40.17	40.26	37.11	36.86	36.98	1.81	1.86	1.84
R2	39.83	40.16	40.00	1.62	1.62	1.62	72.73	77.98	75.36	39.49	33.24	36.36	38.57	39.41	38.99	1.85	1.84	1.85
R3	41.38	41.86	41.62	1.53	1.50	1.52	83.52	83.82	83.67	43.82	44.29	44.05	39.70	39.53	39.62	1.74	1.73	1.74
R4	40.36	40.45	40.41	1.59	1.57	1.58	77.58	76.72	77.15	39.59	37.99	38.79	37.99	38.73	38.36	1.80	1.84	1.82
R5	40.11	40.50	40.31	1.60	1.58	1.59	71.59	78.40	75.00	37.25	39.24	38.25	34.70	39.16	36.93	1.86	1.86	1.86
R6	40.24	40.75	40.50	1.59	1.60	1.60	72.38	78.01	75.20	39.44	39.17	39.30	32.94	38.84	35.71	1.85	1.87	1.86
R7	40.84	40.34	40.59	1.59	1.59	1.59	74.13	77.17	75.65	39.51	39.45	39.48	34.62	37.72	36.17	1.87	1.85	1.86
R8	40.14	39.33	39.74	1.60	1.60	1.60	77.46	77.29	77.38	39.26	39.52	39.26	38.20	37.77	37.99	1.81	1.82	1.82
R9	40.18	39.49	39.84	1.60	1.61	1.61	77.52	76.83	77.18	39.85	39.95	39.90	37.67	36.88	37.28	1.79	1.81	1.80
R10	40.03	39.68	39.86	1.59	1.60	1.60	78.13	78.48	78.31	39.49	40.34	39.92	38.64	38.14	38.39	1.79	1.82	1.81
Seewy	39.49	39.78	39.64	1.58	1.57	1.58	71.13	72.79	71.96	36.48	37.52	37.00	34.65	35.27	34.96	1.81	1.83	1.82
L.S.D at 0.5%	0.58	0.87		0.02	0.05		1.56	2.18		1.33	1.45		1.59	1.84		0.03	0.03	

Data also showed that the highest values for reducing sugars was 44.05% in fruit palm R3 followed by 40.26, 39.92, 39.90, 39.48, 36.36, , 39.30, 39.26, 38.79, 38.25 and 36.36% for Palms R_1, R_{10}, R_9, R_7, R_2, R_6, R_8, R_4, R_5 and R_2 respectively, however Seewy cv recorded 37.00%. Similar results were reported by Salem & Hamdy (1993) and Abo Rekab & El-Kerdany (2008).

As shown in Table 2 non reducing sugars showed the highest values (39.62%) in fruit of palm R_3 followed by 38.99, 38.39, 38.36, 37.99, 37.28, 36.98, 36.93, 36.17 and 35.71%for palms R_2, R_{10}, R_4, R_8, R_9, R_1, R_5, R_7, and R_6 respectively, compared to Seewy cv recorded 37.00%. These results are similar to Sourial *et al*. (1983), Salem & Hamdy (1993) and Abo Rekab & El-Kerdany (2008) **.**

Data recorded that fruits of R_3 had lower tannins average (1.74%) followed byR_9 1.80, R_{10} 1.81, R_8 1.82, R_4 1.82 compared with Seewy cv the highest tannins was recorded (1.82%). On the other hand fruit of R_1 1.84 R_2 1.85 R_5 1.86, R6 1.86 and R_7 1.86 as highest tannins similar results reported by Ragab *et al*. (1956), Bondok (1975) and Abdalla & Nady (2009).

General evaluation and final conclusion

Data tabulated in Table 3 show that palm no. 3 seemed to be the superior type in yield and fruit quality among all the tested palms, as it attained the uppermost score units (100.00) as compared with the "Seewy cv." (85.24).

On the contrary, thus one can conclude that all 3 selected palms are in a good fruit quality for consumer but only palm 3 showed the highest yield.

TABLE 3. Evaluation values of crop, physical and chemical fruit properties at harvest for selected date palms grown in Sohage governorate during (2011 and 2012) seasons .

Selected palms	Yield 50 unite	Fruit weight 10 unite	Pulp weight 10 unite	T.S. S 10 unite	Total sugars 10 unite	Tetratable acidity 5 unite	Tannins 10 unite	Total 100 unite
R1	45.62	9.25	9.20	9.65	9.23	4.72	4.71	92.38
R2	44.35	9.40	9.30	9.61	9.00	4.77	4.69	91.12
R3	50.00	10.00	10.00	10.00	10.00	5.00	5.00	100.00
R4	44.83	8.88	9.13	9.71	9.22	4.80	4.77	91.34
R5	44.61	9.11	9.42	9.69	8.96	4.77	4.66	91.22
R6	43.01	9.00	9.23	9.73	8.99	4.74	4.66	89.36
R7	43.11	9.05	9.21	9.75	9.04	4.77	4.66	89.59
R8	45.29	9.37	9.62	9.55	9.25	4.74	4.77	92.59
R9	43.68	9.60	9.41	9.57	9.22	4.70	4.83	91.01
R10	43.80	8.88	9.59	9.58	9.36	4.74	4.80	90.75
Seewy	39.64	8.84	9.24	9.52	8.60	4.80	4.78	85.24

Conclusion

Data in Tables 1, 2 and 3 show that date palm seedlings (3) seemed to be the superior one in yield and fruit quality among all the tested palms Thus one can

conclude that all 10 selected palms are of a good fruit quality for consumer but only palm R_3 showed the highest yield. The evaluation of this new strain will give good chance for breeders and fruit growers to produce new cultivar.

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تقييم وانتخاب لبعض سلالات النخيل البذريه تحت ظروف محافظة سوهاج

احمد عثمان حمادة
قسم بحوث تربية الفاكهة – معهد بحوث البساتين – مركز البحوث الزراعية – القاهرة – مصر.

اجريت هذه الدراسه خلال العامين ٢٠١١ و٢٠١٢ على سلالات نخيل بذريه ناميه تحت ظروف محافظة سوهاج وتم اختيار عشرة سلالات من النحيل البذري النصف جاف من بين خمسين نخلة بذرية لاجراء التقييم والانتحاب وتم احتيار هذة السلالات البذرية لانها ذات صفات متميزة عن باقى النخيل المنتشر فى المنطقة. وقد أتخذ الصنف السيوي المنتشر في المنطقة كأساس للمقارنة وأظهر التقييم العام.

ان السلالة البذرية رقم ٣ هي أفضل النخيل المختبرة لانها كانت افضل فى كمية المحصول حيث سجلت (١٢٧,٥٥) كيلو جرام عن السيوي الذى كان (١٠١,١١) كيلو جرام كذلك سجلت أعلى الدرجات (١٠٠,٠٠) وايضا عن السلالات الاخري المختبرة خلال العامين. كذلك لتفوقها في الصفات الفيزيائية والكيميائية للثمار بالمقارنة بالصنف السيوي المستخدم للمقارنه . وقد أظهرت الدراسة ان باقى النخيل المختبرة اعلى جوده من الصنف السيوي في الصفات الفيزيائية والكيميائية للثمار مثل قطر الثمرة وطول الثمرة وسمك اللب ووزن الثمره ووزن البذرة ووزن اللب كما اظهرت ارتفاع فى كلاً من مستوى المواد الصلبة الذائبة والسكريات الكليه والمختزله وغير المختزله وانخفاض فى مستوى الحموضة والتانينات.