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Optimal Method for Added Value Increase of Low Quality Dates Obtained from Dates Packaging Factories as by-Product

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ABSTRACT

This work was carried out on date palm (*Phoenix dactylifera* L.) fruits; Saidy date (semi-dry variety) at tamer stage. Low quality dates samples were obtained from the date packing factories as by-product and compared with market dates used inside the factories, El-Kharga oasis, New Valley Governorate and collected during 2018 season. To improve the economic value of low quality dates and added value increase of low quality dates using it as a source for date syrup (dibs) production. Because of the limited research information are hoped to help in increase of dibs production. The collected data pointed out that there were a significant differences in physical properties of dibs, i.e., dibs extraction% (DE%), color (ICUMSA unit) and density (gm./cm3) except pH value, chemical composition, i.e. total sugars%, reducing sugars%, non-reducing sugars%, glucose%(Glu%), fructose%(Fru%) and Glu/Fru, hydroxyl methyl furfural (HMF),dietary fibers%, ash%, total protein, mineral composition, i.e. Ca, K, Na, Mg, P and Fe (mg/100 g on DWB) and sensory evaluation, i.e. taste , of dibs manufactured from market and low quality dates. It was evident from the above-mentioned data that components of dibs of low quality dates are nearly agreed with those in dibs of market dates. Therefore, this may be from the points which pay to use of low quality dates for dibs production and use it as source for dibs production.

Keywords: Low quality dates, dibs, reducing sugars and sensory evaluation.

INTRODUCTION

Egypt considered as the first country of the top ten date producers in the world (1,501,799 tons), followed by Iran (1,083,720 tons) and Saudi Arabia (1,065,032 tons). Date fruits are a good source of low cost food and are an integral part of Arabian diet. Dates known as a dessert fruit are rich in certain nutrients and provide a good source of rapid energy, due to their high carbohydrate content (70–80%). Moreover, date fruits contain fat (0.20–0.50%), protein (2.30– 5.60%), dietary fiber (6.40–11.50%), minerals (0.10–916 mg/100 g dry weight), and vitamins (C, B1, B2, B3, and A) with very little or no starch (Al-Shahib and Marshal 2003). Non-use of lower quality dates by-product for human's food is a real economic loss because it is rich in biologically active compounds that can be extracted and can be used as value added materials to food (Entezari *et al*., 2004; Elleuch *et al*., 2008; Ardali, *et al*., 2014and FAO, 2015).The low quality of date is processed to produce many products such as date syrup. Consequently, are available very large amounts of date fruit. They mentioned that date syrup is a natural sweetener that is a suitable ingredient to be used in formulation of food products in order to improve the nutrient properties. In this respect, they stated that date syrup is one of date's derivatives that can be produced with a high quality and low economic and competitive charge. Date syrup is the natural extract of dates, without any additives, colors or preservatives reagents.

Date syrup (dibs), the main and general product of date, is being used in the preparation of foodstuffs such as jams, marmalades, concentrated beverages, chocolates, ice cream, confectioneries, sweets, snacks, bakery products and health foods as sugar replacer (Besbes *et al*., 2009). In the date syrup industry, the fruits are mixed with water and heated and the main component, sugars, are then extracted. Second-grade dates or low quality dates were to contain the same levels of sugar (73.30–89.55 g/100 g dry matter), fiber (7.95–18.83 g/ 100 g dry matter) and total phenolic (280.6–681.8 mg of GAE/100 g). The objective of study was to improve the economic value and added value of low quality dates by using it in date syrup (dibs) production compared with date syrup manufactured from market dates of this cultivar.

MATERIALS AND METHODS

This work was conducted at Food Science and Technology department, Faculty of Agriculture, New Valley University on date palm (*Phoenix dactylifera* L.) fruits; Saidy date (semi-dry variety) at tamer stage. Low quality dates samples were obtained from the date packing factories as by-product compared with market dates used inside the factory, El-Kharga oasis, New Valley Governorate and collected during 2018 season. To improve the economic value of low quality dates and added value increase of low quality dates as a source for date syrup (dibs) production

Preparation of Date syrup (dibs) from market and low quality dates:

Dibs was prepared from edible and non-edible fruits dates according to the method of Khalil *et al.* (2002). The seeds of the date palm fruits were removed and discarded. The pulp (pericarp) Kilogram of edible and non-edible date fruits was washed with tap water and the stalks and calyxes

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were separated. Two and half liters of water with 0.3% citric acid of sugar weight were added to the pulp date fruits and left overnight. Date juice was obtained by squeezing for mentioned mixture using double gauze piece and rewashed with other two and half liters of water and left overnight in the refrigerator. Then the fruit residue was prone to the later process once again. The combined juice was concentrated using water path at 75ºC for 20-30 min., to obtain date syrup and packed in glass bottles and stored at room temperature (20-30°C). Date syrup was analyzed and evaluated.

Physical properties:- Total soluble solids (TSS) and pH value were estimated by the method described as in AOAC (2016). Date syrup (dibs) color was determined measuring the absorbance of diluted samples at 420 nm as ICUMSA units (Turkmen *et al*., 2006 and ICUMSA, 2011). Dibs Extraction % (DE%) was calculated from the following equation: DE% = Weight of dibs (kg) x 100 / Weight of date (kg).

Chemical composition:- Moisture, Total sugars, reducing and non-reducing sugar, crude protein, crude fat, crude fibers samples was determinate according to the AOAC (2016). Nitrogen free compounds in the sample other than ash, protein, fiber and fat were individually determined, summed and subtracted from 100 using the following formula): Nitrogen free compounds %=100 – (% ash + % protein + % fat + % fiber). Minerals content: The following minerals: sodium, potassium and calcium were determined in samples using the Flame Photometer. Iron, manganese and magnesium were determined using Perkin Elmer Atomic Absorption Spectrophotometer as described in the (AOAC 2016). Glucose and fructose contents: Sugar profile (Glucose and fructose contents) was calculated using high-performance liquid chromatography (HPLC) as reported by Amira *et al.* (2011). Hydroxy methyl furfural (HMF) was calculated using Wunderlin *et al*., (1998) and Känzig *et al*., (2001).

Sensory evaluations:

Sensory evaluations were conducted on the studied date syrup samples. The attributes, including taste, consistency, flavor, preference and total score for dibs, were evaluated by a trained panel, consisting of 25 points were carried out by aid of ten panelists (staff members and graduate students in Food Science and Technology Department, Fac. of Agric. New Valley Univ., according to the method a described in AOAC (2016).

Statistical analysis:

Results are given as means ± standard deviation (SD). The analyses were processed using Excel 2013 software. The sensory evaluations of the products were statistically analyzed by analysis of variance (ANOVA) each experiment in triplicate repeated at least twice and the values presented in terms of means ± standard error using Costat 6.400 (Cohort Software, CA, USA) according to Montgomery (2010).

RESULTS AND DISCUSSION

1-Physical, chemical composition and phytochemical properties of market and low quality dates:

Physical properties:

It should be clarified from the data obtained in this study (Table,1) that there were a significant differences in physical properties, i.e. fruits No./ kg , fruit weight (g), flesh weight (g), pit weight (g), TSS% and pH value of date fruits between market and low quality dates taken from dates factories as by product (El.Hashf). The results revealed that the higher values of fruits No/kg (186.67) and pit% (18.37%) were found in low quality dates, while market dates contained the lower values of fruits No/kg (110.00) and pit % (12.21%). These differences in fruits No/kg and pit% might be due to the variation in fruit weight and flesh weight and the components which had high molecular weights. Market dates scored the higher values of fruit weight (9.09 g), flesh weight (7.98 g) , flesh% (87.79%) , TSS% (73.85%) and pH value (6.08). However, low quality dates of Saidy cultivar contained the lower values of fruit weight (6.36 g), flesh weight (4.38 g) , flesh% (81.67%), TSS% (64.10%) and pH value (5.73). Differences in the physical properties between market and low quality dates of Saidy variety can be attributed to several factors such as genetic, agriculture practices and the environmental conditions. These findings are in harmony with those obtained by Samouni (2017) and Mohammed (2018).

Table 1. Physical properties of market and low quality dates:

Property	Date fruits of El.Saidy cultivar		F	LSD at
	Market	Low grade	Mean value	5%
Fruits No/kg	110.00 [b]	186.67 [a]	148.33 **	16.54
Fruit weight (g)	9.09 [a]	5.36 [b]	7.23 **	0.73
Flesh weight (g)	7.98 [a]	4.38 [b]	6.18 **	0.80
Pit weight (g)	1.11 [a]	0.98 [b]	1.05 *	0.13
Flesh%	87.79 [a]	81.67 [b]	84.73 **	2.50
Pit%	12.21 [b]	18.37 [a]	15.29 **	2.57
TSS %	73.85 [a]	64.10 [b]	68.98 **	0.14
pH value	6.08 [a]	5.73 [b]	5.91 *	0.22

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

*** = Significant, **= Highly significant, Ns= Non-Significant**

Data indicated that the number of fruits/kg of the same cultivar inversely proportionated with the average fruit weight and flesh%. This means that number of fruits /kg as increase as fruit weight decreased and will reflect a high economic value for low quality dates or El.Hashf, which must be taken in consideration. This economic value will increase with increasing of the fruit and flesh weight of El.Hashf because it lead to an increase in the reducing sugars and vice versa. These findings agree with those secured by Ramadan, (1995) and Mohammed (2018).

Chemical composition (on DWB%):

The results in Table 2, clarified that there were a significant differences in chemical composition, i.e. moisture, total sugars, reducing sugars, non-reducing sugar, glucose(Glu), fructose (Fru), Glu/Fru , crude fiber, ash, crude protein and crude fat% between market and low quality dates. Low quality dates was contained the lower value of moisture content (14.13%) than market dates (19.10%) . This means that total solids content of low quality dates was higher than market dates. These results are in harmony with that recorded by Abd- Ellah (2009), Samouni (2017) and Mohammed (2018).

The recorded results in Table 2, indicated that the higher values of glucose/fructose(1.38), crude fiber(4.26%) and ash% (3.16%) were recorded in low quality dates (El.Hashf), while market dates contained the lower values of glucose/fructose(1.07), crude fiber(2.56%) and ash%(2.22%). These differences in chemical components of market or low grade dates caused a negative or positive significant beneficial in fruit weight (g) and fruit flesh (g). Market dates had the higher values of total sugars, reducing sugars, non-reducing sugars, glucose, fructose, crude protein and crude fat (71.50 , 65.04 , 6.38 ,30.65, 28.74, 2.37 and 1.26 %) , while

the lower values (54.97, 54.37, 0.18, 28.99, 21.04, 2.07 and 0.99 %,on DWB) were recorded in low quality dates, respectively. These findings obtained herein are in general accordance with Abd-Elkarim (2016) , Abd El-Majeed (2016) and Mohammed (2018) who recorded that total sugars , reducing and non- reducing sugars of Saidy date were 77.93, 74.10 and 3.83 %,(DWB), respectively . Date fruits assume great importance in human nutrition owing to their rich content of essential nutrients which include carbohydrates, salts and minerals, dietary fiber, vitamins, fatty acids, amino acids and protein. They have enormous scope and potential for use as food for generations to come due to their remarkable nutritional, health and economic value (Chandrasekaran and Bahkali, 2013).

Table 2 .Chemical composition of normal and low quality dates(on DWB%):

Component%	Dates			F	LSD
	Market	Low quality	Mean	value	at 5%
Moisture	19.10 [a]	14.13 [b]	16.62	**	0.71
Total sugars	71.50 [a]	54.97 [b]	63.24	**	0.79
Reducing sugars	65.04 [a]	54.37 [b]	59.71	**	1.72
Non –reducing sugars	6.38 [a]	0.18 [b]	4.78	**	0.32
Glucose (Glu)	30.65 [a]	28.99 [b]	29.82	*	1.02
Fructose (Fru)	28.74 [a]	21.04 [b]	24.89	**	1.31
Glu/Fru	1.07 [b]	1.38 [a]	1.22	**	0.03
Crude fiber	2.56 [b]	4.26 [a]	3.41	**	0.01
Ash	2.22 [b]	3.16 [a]	2.69	**	0.24
Crude protein	2.37 [a]	2.07 [b]	2.22	*	0.17
Crude fat	1.26 [a]	0.99 [b]	1.13	**	0.11

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

Phytochemical of market and low quality dates (on WWB):

Data in Table 3, The results showed that there were a significant differences in Phytochemical compounds of dates, i.e. Carotenoid (mg/100g), Anthocyanin (mg/100g), Total phenolics (GAE mg%), total flavonoid (mg/100g) and tannins (mg/100 g) on wet weight basis (WWB) between market and low quality dates.

Table 3. Phytochemical of market and low quality dates (on WWB).

Characteristic	Dates			F	LSD
	Market	Low quality	Mean	value	at 5%
Carotenoid mg/100g	1.39 [a]	1.18 [b]	1.28	**	0.03
Anthocyanin mg/100g	0.93 [a]	0.78 [b]	0.85	**	0.05
Total phenolic(GAE mg %)	252.00 [b]	283.00 [a]	267.50	**	22.27
total flavonoid mg/100g	4.55 [a]	3.90 [b]	4.22	**	0.16
Tannins mg/100 g	0.40 [b]	0.50 [a]	0.45	*	0.01

GAE = milligrams Gallic Acid Equivalents / 100 .

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

The results given in Table 3, referred that low quality dates were contained the higher values of phytochemical such as total phenolic (283.00 GAE mg/100g) and tannins (0.50 mg/100 g) , while the lower values (252.00 GAE mg and 0.40 mg/ 100g) noted in market dates, respectively .On the contrary low quality dates were contained the lower values of carotenoid (1.18 mg/100g) , anthocyanin (0.78 mg/100g) and total flavonoid (3.90 mg/100g) , while the higher values (1.39 , 0.93 and 4.55 mg/ 100g) noted in market dates, respectively. These results are in the same line with that recorded by Abd El-Majeed, (2016) who revealed that Saidy date flesh contained total phenolic content 297.37 mg as gallic acid/ 100g. Besides, Samouni (2017) and Mohammed (2018) indicated that the tannins content of Saidy date fruits was ranged between 0.388- 0.532%. In this subject, an antioxidant, can quench reactive free radicals, and prevent the oxidation of other molecules and may, therefore, have health-promoting effects in the prevention of degenerative diseases (Biglari *et al*., 2008). Date palm fruit may serve as a good source of the antioxidant (Saafi *et al*., 2009 and Mohammed 2018).

Mineral composition of market and low quality date (on DWB):

The results in Table 4, referred that there were a significant differences in mineral composition for valuable and useful elements analysis of dates, i.e. calcium (Ca mg/100g), potassium (K mg/100g), sodium (Na mg/100g), magnesium (Mg mg/100g), phosphorous (P mg/100g) and iron (Fe mg/100 g) on dry weight basis (DWB) between market and low quality dates. It was observed that low quality dates were had the higher values of macro-elements content such as Ca (40.76 mg/100 g), K (680.16 mg/100 g), Na (84.50 mg/100 g), Mg (127.47 mg/100g) and P (94.72 mg/100 g). While, the lower values of Ca (29.39 mg/100 g), K (556.49 mg/100 g), Na (25.50 mg/100 g), Mg (76.85 mg/100g) and P (68.99 mg/100 g) were scored in market dates. These results are in the same line with that recorded by Abd El-Majeed 2016, Abd El- Galil, 2017, Ramadan *et al*., 2017 and Mohammed ,2018).

Table 4. Mineral contents of market and low quality dates:

Element (mg/ 100g DWB%)	Dates			F value	LSD at 5%
	Market	Low quality	Mean		
Ca	29.39 [b]	40.76 [a]	35.08	**	1.43
K	556.49 [b]	680.16 [a]	618.33	**	14.94
Na	25.50 [b]	84.50 [a]	55.00	**	4.30
Mg	76.85 [b]	127.47 [a]	102.16	**	3.87
P	68.99 [b]	94.72 [a]	81.85	**	6.84
Fe	6.49 [b]	9.83 [a]	8.16	**	1.43

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

Also, The data in the same Table clarified that the micro-elements of low quality dates had the higher value of Fe (9.83 mg/100 g), while, market dates contained the lower value for Fe (6.49 mg/100g). These findings are in agree or disagree with those reported by Abd El.Majeed (2016), Abd El- Galil, (2017) Ramadan *et al*., (2017) and Mohammed ,(2018). They revealed that the date fruits contains a suitable concentration of elements which are very important for human body and metabolic operations in the human cells.

2. Physical, chemical and sensory properties of dibs manufactured from market and low grade dates:

Physical properties:

Data in Table 5, showed that there were a significant differences in physical properties of dibs manufactured from dates, i.e., dibs extraction% (DE%), color (ICUMSA unit) and density (gm./cm3) except pH value between market and low quality dates. The higher value (63.73%) of DE was found in market dates than low quality dates, which contained the lower value (57.35%). The lower value (2856.33 ICUMSA unit) of color intensity was found in dibs produced from market dates. On the other hand dibs produced from low quality dates had the higher value of color intensity (3224.67 ICUMSA unit). The higher value (1.653 gm./cm^3) of dibs density was found in dibs produced from

market dates, while, the lower value of (1.639 gm./cm^3) was recorded in dibs produced from low quality dates. There was no significant differences in pH value of dibs produced from market and low quality dates. Such results are in reasonable agreement with those obtained by Al Farsi and Lee, (2008) and Baliga, *et al.* (2011) Fathi, *et al.* (2013).

Table 5. Physical properties of market and low quality dates dibs.

Property	Dates			F value	LSD at 5%
	Market	Low quality	Mean		
DE %*	63.73 [a]	57.35 [b]	60.54	*	3.33
pH value	5.40	5.75	5.57	Ns	-
Color (ICUMSA)	2856.33	3224.67	3040.5	*	267.09
Density gm/cm^3	1.653	1.639	1.646	*	0.013

DE %= Dibs extraction %.

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

Chemical composition (on DWB):

Data in Table 6, there was non-significant differences in moisture content, total solids (T.S.) and total lipids% between dibs manufacture from market and low quality dates. Because, the total soluble solids percent (TSS%) of dibs manufactured from market and low quality dates determined by Refractometer was equal and adjusted at 72.00 %.

Table 6. Chemical composition of dibs manufactured from market and low quality dates (on DWB%):

Component %	Dibs of dates			F value	LSD at 5%
	Market	Low quality	Mean		
Moisture %	27.59	27.57	27.58	Ns	-
Total solids%	72.41	72.43	72.42	Ns	-
Total sugars	60.11 [a]	57.92 [b]	59.02	*	1.32
Reducing sugars%	58.01 [a]	57.04 [b]	57.52	*	0.79
Non–reducing sugar%	2.10 [a]	0.55 [b]	1.32	*	0.90
Glucose (Glu)%	30.92 [a]	29.65 [b]	30.28	*	1.14
Fructose (Fru)%	26.79 [a]	24.29 [b]	25.54	**	0.37
Glu/Fru	1.15 [b]	1.22 [a]	1.19	*	0.06
HMF **	115.00 [b]	137.33 [a]	126.17	**	7.99
Dietary fibers%	0.19 [b]	0.30 [a]	0.25	*	0.06
Ash%	1.92 [b]	2.23 [a]	2.07	*	0.15
Total protein%	0.95 [b]	1.18 [a]	1.07	*	0.21
Total lipids%	0.35	0.42	0.39	Ns	-

TSS% of dibs produced from edible and non-edible date fruits =72.00%.

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

HMF ** = Hydroxy methyl furfural mg/100 g

*** = Significant, **= Highly significant, Ns= Non-Significant**

The results in Table 6, revealed significant differences in total sugars%, reducing sugars%, non-reducing sugar%, glucose%(Glu%), fructose%(Fru%) and Glu/Fru between dibs manufactured from market and low quality dates. The higher values of total sugars %, (60.11%), reducing sugars content (58.01%), non-reducing sugar content (2.10%), glucose% ,Glu content, (30.92%) and fructose%,Fru content, (26.79%) were found in dibs produced from market dates and the lower values 57.92%, 57.04%, 0.55%, 29.65% and (24.29%) was scored in dibs of low quality dates. The differences of total sugars content in the samples of dibs could be due to the variations of the original total sugars percent in the juice used. The present finding are in good agreement with those recorded by Al-Farsi,(2003) and Aboubacar *et al*.,(2010) who referred that date syrup mainly contains sugars, 95% of which are reducing sugars. The lower value of Glu/Fru (1.15) was the better and found in dibs produced from market fruit dates and the higher value (1.22) was found in dibs produced from low quality dates.

Hydroxyl methyl furfural (HMF) of dibs is one of the most important quality parameters from technological and economical points of view because it produced from breaks down reducing sugars. Where the decrease of HMF reflected the increase of reducing sugars in dibs and consequently the good taste for product. The results given in Table 6, revealed a significant differences in hydroxyl methyl furfural (HMF) of dibs produced from market and low quality fruit dates. The lower value of HMF (115.00 mg/100g) and dietary fibers content (0.19 %) were found in dibs of market dates and the higher value of HMF (137.33 mg/100g) , dietary fibers (0.30%), ash content (1.92%), total protein content (0.95%) and total lipids content (0.35%) were found in dibs of low quality dates, respectively. The present data coincide with those of Wunderlin *et al*.(1998) ; Besbes, *et al*.(2009) and El.Arem, *et al*. (2013) who indicated that the lower value of HMF in dibs was a favorite .

Mineral composition (on DWB):

Data in Table 7, indicated that there were a significant differences in mineral composition, i.e. Ca, K, Na, Mg, P and Fe of dibs manufactured from market and low quality dates. The lower values of Ca (171.67 mg/100 g), K (307.16 mg/100g), Na (74.29 mg/100g), Mg (136.52 mg/100g) , P (166.64 mg/100g) and Fe (4.58 mg/100g) was found in dibs of market dates and the higher values of Ca (190.00 mg/100g), K (369.60 mg/100g), Na (84.00 mg/100g), Mg (157.82 mg/100g), P (179.88 mg/100g) and Fe (5.40 mg/100g) were found in dibs of low quality dates. Such differences might be due to the variation of ash content of market and low quality dates. This result is in general acceptance with those reported by El.Arem, *et al*. (2013) and Hashim & Khalil (2015). It is noteworthy here to mention that dibs produced from market and low grade fruit dates are considered rich sources for the minerals, particularly iron element.

Table 7. Mineral contents of market and low quality dates.

Element (mg/ 100g on DWB%)	Dibs of dates			F value	LSD at 5%
	Market	Low quality	Mean		
Ca	171.67 [b]	190.00 [a]	180.83	**	2.87
K	307.16 [b]	369.60 [a]	338.38	*	21.01
Na	74.29 [b]	84.00 [a]	79.15	**	3.84
Mg	136.52 [b]	157.82 [a]	147.17	*	16.42
P	166.64 [b]	179.88 [a]	173.26	**	3.98
Fe	4.58 [b]	5.40 [a]	4.99	**	0.17

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

Sensory evaluation:

Sensory properties of dibs produced from market and low quality dates, i.e. taste, consistency, flavor and preference were recorded in Table 8. Taste of dibs, which is the first sensory property perceived by the consumers and which could determine if they will buy the product or not, was evaluated for dibs samples. It was observed from the results that taste of dibs, which is the first sensory property perceived by the consumers and which could determine if they will buy the product or not. There were a significant differences in taste for dibs of market and low quality dates. The higher value of taste (23.23) was recorded in dibs of market dates and the lower value (22.30) was found in dibs of low quality dates. This might be explained on basis that fructose content

in dibs of market dates was higher than that in dibs of low quality dates. These findings are in harmony with those reported by Besbes, *et al*. (2009) and El.Arem, *et al.* (2013).

Table 8. Sensory evaluation of dibs manufactured from market and low quality dates

Character	Dates			F	LSD at
	Market	Low quality	Mean	value	5%
Taste	23.23 [a]	22.30 [b]	22.77	*	2.87
consistency	21.11	20.26	20.69	Ns	-
Flavor	22.56	22.18	22.37	Ns	-
Preference	22.76	22.37	22.57	Ns	-
Total score	89.66	87.11	88.39	Ns	-

Notes: Values in the same row with different superscripts are statistically significant from each other ($p < 0.05$).

It was evident from the results in Table 8, that there were non-significant differences in consistency, flavor, preference and total score of dibs produced from market and low quality dates. The higher values of consistency (21.11), flavor (22.56), preference (22.76) and total score (89.66) were recorded in dibs of market dates and the lower values of consistency (20.26), was found in dibs produced from low quality dates. This might be due to dibs not contained large amount of suspended solids, irrespective of dibs concentration. This is a limiting factor for consistency of dibs. Such results are in good accordance with those obtained by Besbes, *et al*. (2009) and El.Arem, *et al.* (2013) .

This suggests that Egyptian consumers prefer dark dibs. These results indicate acceptability for all dibs samples produced from market and low quality dates. Date syrup (72 Brix) or dibs produced from market and low quality dates had similar acceptances.

CONCLUSION

It was evident from the above-mentioned data that contents of total sugars, reducing sugars, Glu, Fru of dibs produced from low quality dates are nearly agreed with those in dibs produced from market dates. Therefore, this may be from the points which pay to use of dibs produced from low quality dates as source for dibs production. So, this work was carried out to known physiochemical of dibs produced from low quality dates and added value increase for low quality dates. Because of the limited research information are hoped to help in increase of dibs production.

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الطريقة المثلى لزيادة القيمة المضافة للتمور منخفضة الجودة المتحصل عليها من مصانع تعبئة التموركمنتج ثانوي

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اجرى هذا العمل على ثمار بلح النخيل ، الصنف الصعيدى وهو صنف نصف جاف حصد على مرحلة التمر ، وتم جمع عينات التمور منخفضة الجودة من مصانع تعبئة التمور كمنتج ثانوى ثم مقارنته مع تمورالسوق لهذا الصنف والمستخدم داخل هذه المصانع ، واحة الخارجة ، محافظة الوادى الجديد اثناء موسم جمع 2018 ، وذلك لتحسين القيمة الاقتصادية للتمور منخفضة الجودة ورفع قيمتها المضافة باستخدامها كمصدر لانتاج شراب التمر (الدبس)، لان المعلومات المحدودة البحثية ربما تكون الامل الذى يساعد على زيادة انتاج الدبس . وأوضحت النتائج المتحصل عليها : ظهور اختلافات معنوية فى جميع الصفات الطبيعية للدبس الممثلة فى نسبة استخلاص الدبس، درجة اللون (وحدة ايكوميسا) ، كثافة الدبس (جم/ سم^3) عدا قيمة درجة الرقم الهيدروجينى كان غير معنوى بين تمورالسوق والتمور منخفضة الجودة . وسجلت اختلافات معنوية فى التركيب الكيمياوى للدبس الممثلة فى نسب السكريات الكلية ، السكريات المختزلة، السكر الغير مختزل، الجلوكوز، الفركتوز ، الجلوكوز الى الفركتوز، هيدروكسى ميثل فورفيورال ، الالياف الغذائية ، نسبة الرماد والبروتين الكلى (على اساس الوزن الجاف) بين الدبس المصنع من تمور السوق و الدبس المصنع من التمور منخفضة الجودة لهذا الصنف. و لوحظت اختلافات معنوية فى تركيب العناصر المعدنية للدبس الممثلة فى قيم الكالسيوم، البوتاسيوم ، الصوديوم ، الماغنسيوم ، الفوسفور والحديد (ملليجم /100 جم على اساس الوزن الجاف) بين الدبس المصنع من تمور السوق و الدبس المصنع من التمور منخفضة الجودة. وقد تبين من النتائج وجود تاثير معنوى على الصفات الحسية للدبس الممثلة فى قيمة الطعم بين الدبس المصنع من تمور السوق و الدبس المصنع من التمور منخفضة الجودة. وبناء على ذلك أستنتج ان مكونات الدبس المصنع من التمور منخفضة الجودة تكون قريبة من مكونات الدبس المصنع من تمور السوق ، وبناء على ذلك هذا يساهم فى استخدام هذه التمور منخفضة الجودة فى انتاج الدبس.