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UtilizationofDates to Process SomeNew DietaryProducts (Marshmallow /Sheets)

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Abstract: This study is performed to investigate the possibility of producing new dietary products called dates marshmallow and sheets with a new technology.The study has been done to search the evaluation of possibility of maximizing utilizationas value-added for dates second degree types to produce natural marshmallowand sheetsin both novels, an economical ways.The obtained results revealed that, mixing the juice of dates with fruit juice such as golden berry and *Tamaridusindica* with ratio 50% led to reduce the content of sucrose, and total sugars. Total phenolic compounds for dates, 50%;*Tamaridus indica*,50% were the highest one. Flavonoids were the highest value in samples dates (100%) followed by the other. It noticed that, carotenoids recorded the highest content in all samples.Objective testing color measurements; the result explains that, all samples treatments with mixing had lowest inlightness(∗L) value. Redness value (∗∗a) which decreased with all samples. However, all treatments including both of controls were observed less in yellowness(∗∗∗b) value. Physical properties - texture attributes, such as hardness attribute for all samples were the best, but Chewiness for dates,100% anddates,50%; *Tamaridus Indica*,50% marshmallow were best samples. Date sheets; itcould be observed that, total phenol compounds content for samples were less than control.On the other hand, fibers, total acidity and vitC were close and almost compatible with the control. It could be clearly observed that, treatment of date sheets product (zero time) for the lightness (∗L) values was less while that, both of the red (∗∗a), and yellowness(∗∗∗b) values were more in compered

with control by increasing time of storage.Finally, It could be clearly concluded that, second degree types of dates are proper, successful, economic and applicable to produce as a new product marshmallows as well as it can be made in sheets form by heat concentrated drying which it gave an added value for dates that was very well for consumer palatability in general by sensory evaluation.

Key words ; dates , dietary products , golden berry, Tamardus-indica ,gelatin , pectin

Introduction

It is well established that dates are rich in sugars (fructose, glucose, and sucrose), minerals (potassium, calcium, magnesium, phosphorous, and manganese), vitamins (particularly A and D), and natural fibers (Yousif and Al-Ghamdi, 1998 and Sawaya, *et al*.,1983).Dates are rich in carotenoids, polyphenols especially phenolic acids, isoflavons, lignans, flavonoids, tannins, and sterols. They have been used in folk medicine for treatment of various infectious diseases such as atherosclerosis, diabetes, hypertension, and cancer, and as antifungal, antibacterial and immunomodulatory(Al-Harthi,1999;Al-Hooti,1995; Ali, *etal.*,2012 and Besbes, *etal.*,2009).Kalifa (2017) reported that, the date crop in Egypt is considered a strategic crop and currently occupies the first place in date production at the world level before Iran and Saudi Arabia. The annual production is estimated at 1.465.030 tons with 17.7% of the world production estimated at 7.5 million tons. The local varieties increased by 15.6%, in addition to the thousands that were introduced and represent a development of the sector. Date fruits have a very high nutritional value since one kg of dates gives around 3000 calories. It was found to consist of 70% carbohydrates (mostly sugars), making it one of the most nourishing natural foods available to human. It also contains proteins, fats, crude fibers, vitamins, mineral, enzymes and other useful substances. The water content ranged between 15 to 30% depending on both variety and maturity stage of the fruit.

Fruit leather is made by drying thin layers of pureed fruit in the oven or dehydrator. Sometimes called fruit rolls or taffies, fruit leathers make delicious, wholesome and nutritious high-energy snacks for people on the go. They are relatively light in weight, easy to prepare and a good way to use leftover canned fruit and slightly over-ripe fresh fruit. Fruit leathers

can be eaten as is, or made into a beverage by combining 5 parts water with 1 part leather in a food blender.Nutritional food values become concentrated in dried fruit, and so do calories. Since moisture is removed, the residue is concentrated.They dehydrated fruit-based products eaten as candy or snacks, and presented as flexible stripes or sheets.Due to its novel and attractive structure, and for being products that do not require refrigeration, they constitute a practical way to incorporate fruit solids, especially for children and adolescents (ShivaniGupta,*et al.,* 2016).Fruit leather, also called a fruit bar or a fruit slab, is a dehydrated fruit-based confectionery dietary product which is often eaten as snack or dessert. Consuming fruit leather is an economic and convenient value-added substitution of natural fruit as a source of various nutritional elements.They contain substantial quantities of dietary fibers, carbohydrates, minerals, vitamins and antioxidants. Furthermore, fruit leather has far fewer calories, less than 100 Kcal per serving, and then many other snacks. Fruit pulp-based fruit leathers are nutritious and organoleptically palatable to customers (Lemuel*et al.*,2014).

Candy is one of favourite foods among people from a wide range of age. Confectionery products are food formulations characterized by aqueous dispersions of sugar syrups and are available in a broad variety of forms including caramels, marshmallows, gums, jellies and gummies, and hard candies.Soft jelly is characterized by a soft and chewy texture typically conferred by a gelatin or pectin-based gel (Fisher, 2011).Chewy candies made with different gelling agents and sweeteners offer certain/specific texture characteristics and eating properties (Utomo*et al.*,2014).

Thus, the aim of this study is to evaluate the production of high quality natural marshmallow and sheets dates as new products for an added value for second degree types of dates. Value addition is another important segment in the date consumption pattern in the world. These value added products are highly viable commercially. It is also extended to study the possibility of production of restructure by using pectin in processed sheets.

Materials and Methods

Materials

Dates, semi dry variety, were purchased from a culture near Giza Governorate. (Gamar El-Dyne) or Commercial Apricot sheets and artificial marshmallows were purchased from a local market in Giza Governorate.

Methods

Preparation of each natural extracts: Semi dry dates were washed and squeeze, then prepared as puree mixed with hand blender.

Preparation ofnatural marshmallow: The producing recipe contains the following ingredients: golden berry juice(50%)/*Tamardusindica* soaked(50%)/semi-dry dates puree(100%) of main total(100ml),coarse sugar(360g),golden syrup(140gm),gelatin(25g), vanilla, confectioners(powdered) sugar, and corn starch or (corn flour).

Process and Preparation of Sheet Products: The producing recipe contains the following ingredients: dates puree (500ml), pectin (200g), and sugar (15g) by using heat-concentrated drying.

Main physical parameters and chemical composition of marshmallow (soft candies): The physicochemical analyses of samples were analyzed according to standards of AOAC (2012). The method for determination of moisture content, crude fiber, total sugars/reducing sugars contents, total acidity (as citric acid), vit C and sucrose.

Tristimulus color measurement: Visual color was measured using a Hunter colorimeter model ColorFlex (Hunter Associates Laboratory, Reston,VA) in terms of L (lightness),a (redness and Greenness) and b (yellowness and blueness). The instrument (45°/0° geometry, 10° observer) was calibrated with a standard black and white tile followed by measurement of samples, Ahmed and Ramaswamy., (2006).

Phenols: were determined according to Maier and Metzler method (1965).

Phenols compound as gallic: were determined according to Boligon,*et al.*,(2009).

Flavonoids: were determined according to Chen and Li(2007).

Carotenoids as (β-Carotene): were determined according to Nagata and Yamashita(1992).

Physical properties: Textural Attributes such as texture profile parameters (Hardness, Cohesiveness, Springiness, Gumminess and Chewiness).

Texture profile analysis test of samples (which shape was 3×3×3 cylindrical)was done using a Universal Testing Machine (TMS-Pro) Food Technology Corporation, Sterling, Verginia, USA) equipped with 1000 N (250 lbf) load cell and connected to a computer programmed with Texture ProTM texture analysis software (program, DEV TPA With holding time between cycle two second). A flat rod probe (49.95 mm in diameter) to uniaxiallycompresse the samples with the following parameters conduction to 25 % of their original height. Each sample was subjected to two subsequent cycles (bites) of compression-decompression.

Data were collected on computer and the texture profile parameters were calculated from DEV TPA texture analyzer and computer interface. Calculation described by Szczesniak*et al.,* (1963) and Bourne (1978) was used to obtain the following texture profile parameters (Hardness, Cohesiveness, Springiness, Gumminess and Chewiness).

Water activity (a_w): The major advantages of the chilled mirror dew point methods are speed and accuracy. Since the measurement is based on temperature determination, calibration is unnecessary, but running a standard salt solution checks proper functioning of the instrument. If there is a problem, the mirror is easily accessible and can be cleaned quickly in a few minutes. For some applications, fast readings allow manufacturers to perform at-line monitoring of a product's water activity (Rockland and Nishi, 1980).

Rehydration of marshmallow (soft candies):was determined according to the method stated by Von Loesecke (1955) as following: 10 g the tested dry material samples were placed in 600 ml Pyrex beaker, 80 to 150 ml distillated water were added, covered with a watch glass, placed on electric heater, as boiled for 5 min., removed from the heater and dumped into a 75 min., buchner funnel which was covered with a coarsely porous filter paper. Suction was gently applied and drained with careful stirring for one min., or until the drip from the funnel has almost stopped. Samples were removed from the funnel and a weighted calculation was made to express in terms of "Reconstitution ration".

Rehydration ratio= Thedrained weight of the rehydration sample (WR). X 100
The origin weight of the dehydration sample (WD).

Sensory evaluations of marshmallows product: For the sensory analysis a simple hedonic scale with a small number of points (from 1 to 10 with 1- i don`t like it and 10 - i like it very much) was used in order to evaluate the first impression, the aspect, the quality attributes (color, taste, flavor, texture, appearance and overall acceptability of the samples of soft candies compared with artificial marshmallows (control). Using suggested was evaluated for their sensory characteristics by ten panelists from the staff of the Processing Crops, Research Dep., Agric. Res. Center, Giza. Acceptability giving numerical scores to each of their attributes from 10 panelists. The produced was organoleptically judged by groups of panel testers. The quality was scored on a scale (1 to 10). The following scale was applied to all samples for color, taste, flavor, Texture, Appearance, and overall acceptability as follows: Excellent= (100), Very good= (8-9), Palatable. = (6-7), and Unpalatable. = (0-5).These proportion were scored on a scale from 1-10 according to Watts *et al.*, (1989).

Statistical analysis: Data were analyzed by Analysis of Variance using General Liner Model (GLM) procedure according to Sendecor and Cochran (1997). Means were separated using Duncan's test at a degree of significance ($P \leq 0.05$). Statistical analyses were made using the producer of the SAS software system program (SAS, 1997).

Results and Discussion

Marshmallow is a confection of foam-like structuredue to the presence of gelatin,it possesses good chewing propertiesand demand for it is constantly growing on the world market.Although the nutritional value of the main types of marshmallow remains very poor, because of the most of them are synthetic,therefore a positive impact go beyond a good colour, taste and smell.Marshmallows are simply described as air bubbles surrounded by sugar syrup. After both of (sucrose, corn syrup, and water,is cooked at appropriate temperature to reach the desired water content, which allows air to be whipped into the matrix by mechanical agitation.During whipping, the density of the product decreases as the syrup and foam mixture expands into a light, fluffy marshmallow(Sucharzewska*et al.*, 2003; Ergun *et al.*, 2010).The demand for natural color source of such compounds is increasing day by day because of awareness of positive health benefit out of natural compounds

as powerful antioxidants pigment/ flavor.Table (1) shows that, some main physical parameters and chemical composition which were determined for a new type of (soft candies)/or marshmallow products also called in this case (dates marshmallow), what made of dates juice. From Table (1), it could be clearly observed that, moisture content for date marshmallow samples was more than both of controls but blank was the less one, according to Ergun,*et al*.,(2010).Total solids were lower in all samples than control and blank.Dates (100%) sample in its sucrose contain was less than two controls and blank but was more than two other samples which had mixed with (50%) both of golden berry and*Tamaridusndica*. This indicates that, mixing the juice of dates with fruit juice such as golden berry and *Tamaridusindica*with ratio 50% due to reduce its the content of sucrose. Total sugars contain of samples were less than control(2),but reducing sugars recordedless value in both of blank and control(1) than other one. Total sugars containin all new types of natural source marshmallows were less including blank and control (1). These are also, mean that, the mixing with(50%) both of golden berry and *Tamaridusndica*benefit in reducing the percentage of total sugars for samples dates, but almost close to the proportion of imported control(1).

Table(1) Main physical parameters and chemical composition of date marshmallows (means±SD)

Local Control (2).	**13.00±0.10**	**94.10±0.14**	**0.00±0.00**	**9.16±0.02**	**3.20±0.01**	**12.36±0.01**
Blank	**11.07±0.25**	**94.50±0.17**	**0.00±0.00**	**7.53±0.01**	**4.41±0.02**	**11.94±0.04**
Dates (100%).	**18.41±0.12**	**81.59±0.08**	**0.00±0.00**	**9.72±0.26**	**2.17±0.10**	**11.89±0.02**
Dates(50%)/ GoldenBerry(50%).	**17.50±0.17**	**82.50±0.15**	**0.00±0.00**	**9.66±0.12**	**1.53±0.04**	**11.19±0.02**
Dates(50%)/*Tamaridusndica*(50%).	**19.11±0.08**	**80.89±0.21**	**0.00±0.00**	**9.81±0.24**	**0.58±0.00**	**10.39±0.01**

∗All the values are meansof triplicate±SD.

Table (2) showed that, the phenolic in both of the samples local Cont.,(2) blank and dates ,100% as well as dates,50%; golden berry,50% were little, as for dates,50%;*Tamaridus indica*,50% was the higher than imported cont.,(1). Flavonoids were the highest value in samples dates, 100% followed by dates, 50%; golden berry,50% and dates,50%;*Tamaridus indica*,50% compared with blank followed by both controls imported (1) and local (2) their less content of flavonoids. It noticed that, carotenoids recorded the highest content in all samples including local cont., (2) except blank was less one. Al-Harthi,(1999).

Table(2) Total phenolic, flavonoids and carotenoids of date marshmallow products (means±SD)

Samples	Phenolic (mg/ggallic) .	Flavonoids (mg/gqueratene).	Carotenoids (mg/g as β-carotene).
Imported Control (1)	**0.122±0.02**	**0.086±0.01**	**0.5760±0.03**
Local Control (2)	**0.048±0.00**	**0.094±0.01**	**0.7760±0.02**
Blank	**0.098±0.01**	**0.137±0.02**	**0.0017±0.00**
Dates (100%).	**0.098±0.01**	**0.217±0.03**	**0.7800±0.01**
Dates(50%)/Golden Berry(50%).	**0.072±0.02**	**0.191±0.01**	**0.9290±0.02**
Dates(50%)/*Tamaridusi ndica*(50%).	**0.264±0.04**	**0.177±0.02**	**0.8500±0.01**

∗All the values are means of triplicate ±SD.

The hunter L,a,b color scale may be used on any object whose color may be measured. From Table (3) data shows that, it could be clearly observed, the lightness values (∗L)for sample [dates 100%]equal(62.00)was less than both treatments of dates,50%; golden berry,50%,and dates,50%; *Tamaridusindica*, 50% which had (65.04±0.14,66.60±0.09)with compared to blank; imported cont.,(1); and local cont.,(2)] were lightness had (∗L) values of (77.00±0.08to 69.05±0.06), that mean the three samples not displayed lighter, compared to blank; imported cont.,(1); and local cont.,(2). All samples appeared to have low (∗L) value(indicating dark color) which not pure sugar, as shown in the table. On other hand, the red value(∗∗a) of dates, 100%equal (0.03±0.00) was also less than dates, 50%; golden berry,50% and dates,50%; *Tamaridusindica*, 50% which had(0.07±0.01,0.08±0.02)in compared to blank,local cont.,(2) and imported cont.,(1) in value averaged from (1.96±0.02 to 0.12±0.01) as a result were observed. In fact red value (∗∗a) decreased when samples of natural source or not pure sugar. Also, yellowness (∗∗∗ b) values (2.85±0.04, 3.01± 0.01,3.95 ±0.02,4.56± 0.05,5.33±0.02) for treatments dates, 100% followed by dates, 50%; golden berry, 50%,dates, 50%; *Tamaridusindica*,50% and local cont.,(2) as well as imported cont.,(1) were less than blank, hence can be best represented by hunter color (∗∗∗b) to distinguish the color difference of the resulting marshmallow dates. From those results, it isconclude that, there is a convergence in the color for the date marshmallow products with two controls samples, indicating that the process of mixing dates with(golden berry and *Tamaridusindica*) did not change the color

significantly, so that the products produce in their original colors which refer to the original or basic product,(Karim and Baht 2008).

Table (3) Objective testing color measurements for date marshmallows products (means±SD)

Color Intensity. / Treatments.	*L	**a	***b
Imported Control (1)	**73.03±0.15**	**0.12±0.01**	**5.33±0.02**
LocalControl(2)	**69.05±0.06**	**0.09±0.01**	**4.56±0.05**
Blank	**77.00±0.08**	**1.96±0.02**	**12.59±0.16**
Dates (100%).	**62.00±012**	**0.03±0.00**	**2.85±0.04**
Dates (50%)/ Golden Berry (50%).	**65.04±0.14**	**0.07±0.01**	**3.01±0.01**
Dates (50%)/*Tamaridusindica*(50%).	**66.60±0.09**	**0.08±0.02**	**3.95±0.02**

∗*L*:Lightness (0 =black-100= white). ∗∗*a*: Redness and Greenness(0= green - 60=red).∗∗∗*b*: Yellowness and Blueness(0=bluer - 60 yellow).

∗All the values are means of triplicate ±SD.

Ergun *et al.,* (2010) mentioned that, water is one of the most important components of confections.Progressing from the use of water content to water activity, to the principles of water mobility.One of the main functions of water in confectionery formulas is to dissolve the ingredients and help with mixing. In most candies, the water is used to dissolve and prepare the slurry of sugar and corn (glucose) syrup.Marshmallows may be either ungrained or grained, depending on the ratio of sucrose to corn syrup. Water content affects marshmallow hardness and flow properties.Ungrained marshmallows typically have moisture content of 15–18%. A fresh-made, ungrained marshmallow has fairly high aw, above 0.7, dependent on moisture content and composition.From Table (4) data showed that, physical properties - texture attributes are (hardness, cohesiveness, springiness, gumminess, and chewiness).Physical structure is often altered by changes in water activity due to moisture gain resulting in a transition from the rubber to the glassy state. On the other side also, reveal that, there is a reverse relationship between marshmallow products hardness and its water content in table. The data showed that, had significant difference for water content in all suggestion marshmallow, when fresh and throughout the ripening period.

From data shown in Table (4) the hardness attribute for imported cont.,(1) marshmallow was the best followed by the marshmallow sample of the blank,12%; dates, 100%; dates, 50%; goldenberry,50%;and dates, 50%; *Tamaridus indica*,50% but the lowest sample of marshmallow blank,15%. Cohesiveness; showed that, there is no significantly different between all samples marshmallow. Springiness; there is no significantly different for samples local Cont.,(2); blank,12%; dates, 100%; dates,50%; golden berry,50%, and dates,50%;*Tamaridusindica*,50% marshmallows

compared with imported control (1) followed by blank,15% and imported Cont.,(1) are the lowest with significantly differences between them. Gumminess; imported Cont.,(1) were the best followed by blank,12%;dates,100% ; and dates ,50% ;*Tamaridusindica*, 50%butblank,15% and local cont.,(2) as well as dates,50%; golden berry,50% marshmallow were the worst. Chewiness; imported cont., (1) followed by blank ,12%;15% and dates,100% as well as dates,50%;*Tamaridusindica*,50% marshmallow were the best one. On the other hand, local cont., (2) and dates, 50; golden berry,50% were the worst by there are moderate significantly differences. Water activity (a_w); both of local cont.,(2) as well as both of samplesdates,100% ; dates,50%;golden berry,50%anddates ,50%;*Tamaridusindica* , 50% marshmallow had the highest values, this means the least quality. On the other hand,imported cont., (1) was the best one,followed byblank ratio (15%) was the lower values than ratio (12%) that means the best one.Lim *et al.,(*2006) studied that, the initial water content of the marshmallow was 19.5%, and though water activity was not measured, it was probably between 0.65 and 0.70 if not higher. After 20 weeks of storage, the marshmallow water content had decreased to 7.9%and hardness had increased.

Table (4) Textural attributes such as texture profile parameters/ water activity for date marshmallow products

Parameters / Treatments	Physical property					Water activity	Moisture content (%)
	Hardness (g)	Cohesiveness (~)	Springiness (mm)	Gumminess	Chewiness (g/mm)		
Imported Control (1)	**3.10^{a}**	**0.89^{a}**	**5.00^{b}**	**2.80^{a}**	**13.85^{a}**	**0.635^{b}**	**12.00^{bc}**
Local Control (2)	**1.60^{b}**	**0.87^{a}**	**6.24^{ab}**	**1.40^{b}**	**8.85^{c}**	**0.724^{ab}**	**13.00^{b}**
Blank.							
a (15%)	**1.50^{b}**	**0.87^{a}**	**9.00^{a}**	**1.30^{b}**	**11.61^{b}**	**0.789^{ab}**	**11.07^{c}**
b (12%)	**2.10^{ab}**	**0.86^{a}**	**6.75^{ab}**	**1.80^{ab}**	**12.12^{ab}**	**0.806^{a}**	**10.06^{ab}**
Dates (100%).	**2.10^{ab}**	**0.87^{a}**	**6.25^{ab}**	**1.80^{ab}**	**11.33^{b}**	**0.715^{ab}**	**18.41^{a}**
Dates (50%)/GoldenBerry (50%).	**1.60^{b}**	**0.87^{a}**	**6.24^{ab}**	**1.40^{b}**	**8.25^{c}**	**0.729^{ab}**	**17.50^{ab}**
Dates (50%)/*Tamariduindica* (50%).	**2.10^{ab}**	**0.87^{a}**	**6.25^{ab}**	**1.80^{ab}**	**11.30^{b}**	**0.745^{ab}**	**19.11^{a}**

*Means followed by different letters in the same column are significantly different at $p \leq 0.05$.

From these results which are shown in Table (5): Imported cont.,(1) increased by increasing time of the soaking and was supposed to decrease with increasing the rehydration time, while the all of other

samples as blank; dates,100%; dates ,50%; golden berry ,50% and dates, 50%; *Tamaridusindica*, 50% respectively., take to decrease including locally cont.,(2). Finally, it is noticed that, more than (2 hours) of the rehydration time had occurred deterioration for reconstitution ratio values of marshmallow samples by increasing time of soaking with no significant differences between them compared with imported control (1) and dates, 50%; golden berry, 50%and dates, 50%; *Tamaridusindica*, 50% as well as locally control (2) was the worst value, according to (Kirtil, *et al.,* 2017).

Table (5) Rehydration ratio samples for date marshmallow products

Reconst.,/Time (every 1 hr.). / **Treatments.**	**1 hr.**	**2 hrs.**	**3 hrs.**	**4 hrs.**	**5 hrs.**	**6 hrs.**
Imported Control (1)	**127.56^{a}**	**138.95^{a}**	**142.60^{a}**	**146.24^{a}**	**146.70^{a}**	**150.80^{a}**
Local Control (2)	**101.55^{bc}**	**83.51^{bc}**	**69.24^{b}**	**56.77^{b}**	**42.39^{b}**	**33.19^{b}**
Blank.	**90.23^{c}**	**86.67^{bc}**	**77.82^{b}**	**67.47^{b}**	**57.13^{b}**	**47.59^{b}**
Dates 100%.	**72.18^{d}**	**61.58^{c}**	**55.79^{b}**	**41.53^{b}**	**32.06^{b}**	**29.94^{b}**
Dates (50%)/ Golden Berry (50%).	**81.41^{cd}**	**69.72^{bc}**	**58.32^{b}**	**45.73^{b}**	**33.73^{b}**	**23.24^{b}**
Dates (50%)/ *TamaridusIndica* (50%).	**89.23^{cd}**	**67.44^{bc}**	**58.63^{b}**	**46.04^{b}**	**37.09^{b}**	**29.83^{b}**

*Means followed by different letters in the same column are significantly differentat $p \leq 0.05$.

The data showed that no significant difference in color in Dates, 100%; and imported cont.,(1) marshmallow. Taste showed no significant difference between local cont., (2) and dates, 50%; golden berry, 50%; blank ; dates, 100% as well asimported cont.,(1);and dates, 50%; *Tamaridusindica*,50% while flavor of marshmallow samples were recorded the same score in arrangement. Texture showed no difference between imported cont., (1) local cont.,(2) and dates, 50%; golden berry, 50% also blank; dates, 100% and dates, 50%; *Tamaridusindica*, 50%. Acceptability, all samples recorded highest score except imported cont., (1) and local cont.,(2) showed lower score. It can be concluded that, the moderate scores of the sensory parameters showed in (6) suggestion marshmallow which contain imported cont.,(1)and local cont.,(2) as well as dates, 50%; *Tamaridusindica*, 50%. It could be observed that, samples blank; dates,100%; and dates, 50%; golden berry, 50% marshmallow respectively., had the same record highest score of taste, flavor and

palatability and the better than artificial marshmallows according to Artamonova, *et al.,(*2017) and Liana-Claudia *et al.,(*2015).

Table (6) Sensory evaluation of date marshmallow products

Samples.	Color	Taste	Flavor	Texture	Acceptability
Imported Control(1).	**6.9^{ab}**	**6.4^{b}**	**6.3^{b}**	**6.5^{b}**	**6.9^{b}**
Local Control(2).	**6.6^{b}**	**7.5^{ab}**	**6.8^{ab}**	**6.6^{b}**	**6.7^{b}**
Blank.	**8.0a**	**8.5^{a}**	**7.8^{a}**	**7.4a**	**8.8^{a}**
Dates 100%.	**7.5^{ab}**	**8.8^{a}**	**7.6^{a}**	**7.9^{a}**	**8.9^{a}**
Dates (50%)/ Golden Berry (50%).	**8.0^{a}**	**7.4^{ab}**	**6.7^{ab}**	**6.8^{b}**	**7.9^{a}**
Dates (50%)/ *TamaridusIndica* (50%).	**6.5^{b}**	**6.8^{b}**	**6.6^{b}**	**7.5^{a}**	**8.0^{a}**

∗Means followed by different letters in the same column are significantly different at $p \leq 0.05$.

Date fruits have a very high nutritional value. It consist of 70% carbohydrates (mostly sugars), making it one of the most nourishing natural foods available to man. It also contains proteins, fats, crude fibers, vitamins, mineral, enzymes and other useful substances. The water ranged between 15 to 30% depending on the variety and on the maturity stage of the fruit. Having characteristics of low fats, appropriate moisture contents, carbohydrates and other nutritional values with a sweet and supple taste and texture along with a chewing pleasure, dates are considered as complete food and are cherished all around the world. From table(7), it could be observed that, moisture content of date sheets (zero-times and 3months) were between 14.87% and 16.82%), these results were more than the moisture content of control. Most fruit leathers are dried at 30 to 80º C, especially at 50 to 60ºC for up to 24 hours or until they have reached the final moisture content of 12–20% (w.b.,)Lemuel (2014).Total phenol compounds for samples (54.8 and 54 . 5mg) respectively., were less than control (55.5). On the other hand, fibers, total acidity and vitC was close and almost compatible with the control (6.35,6.25 and 5.98g/100g) (0.98,0.96 and 0.92) and (0.08 , 0.07and 0.09)respectively.,.

Table (7) Main physical parameters and chemical composition for date sheets after being storage at ambient temp.,(25±2ºC) for 3 months

Parameters / Treatments	Moisture Content (%)	Total Solids (TS)	Total Phenolic Compounds (mg)	Fibers. (g/100g)	Total Acidity (as citric acid)	Vit C/ (mg/100g)
Control (apricot sheets).	11.33	88.67	55.5	6.35	0.98	0.08
Date sheets product (zero time).	14.87	85.13	54.8	6.25	0.96	0.07
Date sheets product (3 months).	16.82	83.18	54.5	5.98	0.92	0.09

These results from table (8) for effect of storage at (25±2°C) of shelf-life on soluble sugars of date sheets (zero-times and 3months) compared with control (apricot sheets) were noticed that,the total sugar, reducing, and non-reducing sugars were less the longer storage. Knowing that, wecouldn't compare here with apricot sheets because originally is low in the content of soluble sugars as shown from the table.

Table (8) Effect of storage for date sheets on soluble sugars after being at ambient temp., (25±2ºC) for 3 months

Parameters. / Treatments	Total Sugar.	Reducing Sugars.	Non- Reducing Sugar.
Control (apricot sheets).	69.6	46.1	23.5
Date sheets product (zero time).	72.8	46.6	26.2
Date sheets product (3 months).	71.5	46.1	25.4

The hunter L,a,b color scale may be used on any object whose color may be measured. From table (9), it could be clearly observed that, treatment of [date sheets product (zero time)] for the lightness values (*L) equal (19.59±0.01) was less than date sheets product (3 months) which lightness had (*L) values of (20.12±0.04) compared with control as shown in the table that were appeared to have low (*L) value (indicating dark color).On other hand, the red (**a) value equal (3.95±0.00) for date sheets product (zero time) was more than value (3.55±0.01) for date sheets product (3 months) compared with control (3.85±0.02) as a result

were observed. In fact red value (**a) decreased when the time of storage were increased, while the yellowness (***b) values (3.55±0.01) for date sheets product (zero time) was also, more than values (3.08±0.02) of date sheets product (3 months) in compered with control by increasing time of storage, that hence can be best represented by hunter color ***b to distinguish the color difference of the resulting sheets dates. From these results, it conclude that, there is a convergence in the color for the date sheets products with control sample, indicating that the storage at ambient temp.,(25±2ºC) for 3 Months did not change the color significantly, so that the products produce in their original colors which refer to stability of their color. Karim and Baht (2008), and Phimpharian,*et al.*,(2011).

Table (9) Objectivetesting color measurements for date sheets products after being storage at ambient temp . ,(25±2ºC) for 3 months (means±SD)

Color Intensity,(Hunter Calorimeter,L,A,B). Treatments.	***L**	****a**	*****b**
Control.	**19.95±0.02**	**3.85±0.02**	**3.50±0.01**
Date sheets product (zero time).	**19.59±0.01**	**3.95±0.00**	**3.55±0.01**
Date sheets product (3 months).	**20.12±0.04**	**3.55±0.01**	**3.08±0.02**

**L*:Lightness(0 =black-100= white). ***a*: Redness and Greenness(0= green - 60=red). ****b*: Yellowness and Blueness(0=bluer - 60= yellow).

∗All the values are means of triplicate ±SD.

From these results which is shown in table (10): All samples were decreased by increasing time of the soaking. It can be concluded that, there aresignificantly different of thereconstitution ratio parameters between samples of sheets (3moths) and [control and samples (zero-time)] sheets samples which had showed in (10) suggestion sheets of samples,Lemuel (2014) reported that, these ingredients are mixed with the fruit puree to make fruit leathers with a higher quality, longer storage, or better organoleptic quality than the original fruit. Most fruit leathers are dried at 30 to 80° C, especially at 50 to 60°C for up to 24 hours or until they have reached the final moisture content of 12–20% (w.b.,).

Table (10) Rehydration ratio for date sheets products after being storage at ambient temp.,(25±2ºC) for 3 months

Reconst.,/Time (min). / Treatments.	30 min	60 min	90 min	120 min	150 min
Control.	**85.71^{b}**	**85.71^{b}**	**71.42^{b}**	**57.14^{b}**	**42.86^{b}**
Date sheets product (zero time).	**85.71^{b}**	**85.71^{b}**	**71.42^{b}**	**57.14^{b}**	**42.86^{b}**
Date sheets product (3 months).	**114.29^{a}**	**114.29^{a}**	**100.00^{a}**	**100.00^{a}**	**85.71^{a}**

*Means followed by different letters in the same column are significantly different at $p \leq 0.05$.

The data showed that, no significant difference in color, flavor, and acceptability in all suggestion sample sheets. Texture showed no significant difference between samples (zero time and 3months) while control sheets recorded the highest score. Taste showed difference between all samples. Control sample sheet recorded the highest score next (zero-time and 3moths respectively.,). It can be concluded that, taste had significantly different scores of the sensory parameters showed in (11) suggestion sheets of samples .It could be observed that all samples sheets have the same record score of flavor and acceptability but in taste and texture recorded no significant differences between them. According to ShivaniGupta, *et al.*,(2016), andPhimpharian, *et al.*,*(*2011).

Table(11) Sensory evaluation of date sheets products after being storage at ambient temp.,(25±2ºC) for 3 months

Samples.	Color	Taste	Flavor	Texture	Acceptability
Control.	**7.6^{a}**	**8.7^{a}**	**8.1^{a}**	**8.6^{a}**	**8.5^{a}**
Date sheets product (zero time).	**7.7^{a}**	**8.4^{b}**	**7.9^{a}**	**7.9^{b}**	**8.7^{a}**
Date sheets product (3 months).	**7.7^{a}**	**8.0^{c}**	**7.8^{a}**	**7.9^{b}**	**8.8^{a}**

*Means followed by different letters in the same column are significantly different at $p \leq 0.05$.

It could be finally concluded through this study, it is proper, successful economic and applicable to produce vegetables and fruits marshmallows giving the same amount of taste and aroma, hence we must resort to natural sources which are very suitable to be taken as a good natural food or natural-food additive with many categories of healthy foodstuffs. The phytochemical analysis of the marshmallows and sheets dates revealed it being a good source of total phenolic and flavonoids. These compounds which found naturally in dates protect body from free

radical, improve immune system and also have health benefits. Date marshmallow and sheets as new products had given added value for second degree dates.

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الإستفادة من التمور فىإنتاج بعض المنتجات الغذائية الجديدة(المارشيميللو/ اللفائف)

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الملخص العربى

تم إجراء هذه الدراسة للبحث في إمكانية إنتاج منتجات غذائية جديدة تسمى "مارشميلو ، و لفائف" التمرباستخدام تقنيةجديدة.

وقد أجريت هذه الدراسة للبحث في تقييم إمكانية تعظيم الاستفادة كقيمة مضافة لأنواع التمور من الدرجة الثانية لإنتاج مارشميلو الطبيعية و لفائف بطرق مبتكرة واقتصادية.

أظهرت النتائج التي تم الحصول عليها أن خلط عصير التمر مع عصير الفاكهة مثل الحرنكش و التمر هندى بنسبة ٥٠٪ للمارشيمللو أدى إلى تقليل محتوى السكروز والسكريات الكلية. امامركبات الفينولية الكلية لخليط للتمر، والتمر هندى، بنسبة ٥٠ ٪ لكلا منهما كانت أعلى قيمة. الفلافونيدات فقد سجلت أعلى قيمة فى عينة التمر نسبة(١٠٠ ٪) ثم يليها العينات الأخرى ،ولاحظنا أن الكاروتينات هى ايضا سجلت أعلى محتوى بكل العينات. إختبارات القياسات اللونية؛ أوضحت النتيجةأن جميع معاملات العينات ذات الخلط كانت أقل قيمة في مجال اللونى للابيض (L*). اما القيمة االتى فى مجال اللون للاحمر (a**) التي انخفضت مع جميع العينات. ومع ذلك ، لوحظت ان جميع المعاملات بما في ذلك كل من الكنترول كانت أقل في قيمة المجال للونى للاصفر(b***). الخواص الفزيائية- خصائص الملمس؛ والتى منها صفة الصلابة فإن جميع العينات اعطت افضل نتيجة، اما صفة المضغ بالنسبة لعينة تمر ١٠٠% ، وكذلك عينة الخلط بنسبة ٥٠ % بالتمر الهندى للمارشيمللو كلاهما اعطت افضل العينات.لفائف التمر؛ فإنهيمكن ملاحظة أن محتوى مركبات الفينولات الكلية للعينات كانت أقل من الكنترول،ومن ناحية أخرى فإن الألياف والحموضة الكلية والفيتامين(سى)كانت قريبة بل تقترب من الكنترول، اما بالنسبةلإختبارات القياسات اللونية؛ فمن الممكن الملاحظة بوضوح أن معاملة منتج لفائف التمرفى فترة (zero-time) لقيم مجال اللونى للابيض (L*) كانت أقل القيم، بينما قيم كل من المجال اللونىللاحمر (a**) والاصفر (b***) كانت الأكبرمقارنة بالكنترول وذلك مع إطالة فترة التخزين.أخيراً، يمكن الاستنتاج بوضوح أن أنواع الدرجة الثانية من التمور تكون مناسبة وناجحة واقتصادية وقابلة للتطبيق لإنتاج منتج جديد من المارشيمللو، كمايمكن تصنيعه فى صورة لفائف بواسطة التجفيف المركّز بالحرارة ممايعطى للتمورقيمة مضافة التى كانت جيدة للغاية بشكل عام عند إستساغة المستهلك من خلال التقييم الحسي.

الكلمات المفتاحية؛التمر، المنتجات الغذائية، الحرنكش، التمر الهندى، الجيلاتين، البكتين.