

SUITABILITY OF NINE SAUDI DATE CULTIVARS FOR CANDY MAKING

Ali K. Yousif* and A. S. Alghamdi

Date Palm Research Center, KFU, P.O. Box 400, Hofuf 31982,
Saudi Arabia

ABSTRACT

The optimum processing conditions as well as the suitability of nine Saudi date cultivars for candy making was studied. The storability of the prepared date candy was also covered. The obtained results showed that the ratio 60/40 date paste / nuts with chocolate coating achieved the best scores and was better than the other examined ratios. Regarding the effect of cultivar on the quality of the prepared date candy, it was shown that candy made from Ruzeiz and Sullag dates were evaluated as the best amongst the nine date cultivars used in this study. The storability study results revealed that storage duration for more than 8 weeks at room temperature ($25 \pm 5^\circ \text{C}$) had a pronounced negative effect on most of the quality attributes of date candy. After 16 weeks storage time, the date candy was evaluated as poor and inferior to the imported Mars. However, these drawbacks in date candy might be attributed to storage at relatively high temperature and storage at low temperature ($10\text{-}15^\circ\text{C}$) should be recommended.

INTRODUCTION

Candy or confectionery is considered a popular food item amongst the population of the Kingdom. There are different types of candy available in the local market most of which are imported. The availability of dates in the Kingdom in substantial quantities and their high levels of sugars justify their use in processing plain or chocolate coated date candy which can be used as a partial replacer for similar imported candy products which accounted for about \$ 60 million for the year 1996 (Statistical Yearbook, 1997).

Sawaya et al. (1983) studied the possibility of fortifying date bars with soy protein isolate (SPI) and dry skim milk (DSM) in an attempt to improve their nutritive value. Their results revealed that the addition of SPI and DSM could enhance the protein quality and quantity of date bars without any deleterious effect on their acceptability. The sensory

* Present address: Associate professor, Department of Nutrition and Food Technology, Faculty of Agriculture, University of Jordan, Fax: 9626833059

evaluation results also indicated no difference in the control and fortified date bars which were stored for 6 months. Addition of 1.5% SPI and 10.5% DSM was found to be the optimal level of supplementation in terms of nutritious benefit.

Yousif et al. (1987) studied the possibility of using date paste as a replacer for caramel or sugar paste in preparing candy bars. Processing conditions, nutritive value and organoleptic properties of the prepared date bars as well as their storability were evaluated. The results indicated that the prepared date bars either plain or chocolate coated had good acceptability, possessed a high nutritive value and could be stored for more than 5 months under refrigeration (5° C) without affecting their qualities.

Recently, utilisation of second quality dates by processing and storage of plain and chocolate coated date bars for up to 6 months at 25 C was investigated by Yousif (1995). The obtained results highlighted the possibility of storing chocolate coated date bars at 25° C up to 6 months without affecting their good quality attributes.

MATERIALS AND METHODS

Materials

Samples of nine date cultivars, at the tamar stage, representing the major date producing region in Saudi Arabia were used in this study. The Eastern region (Al-Ahsa and Al-Quatif) was represented by three date cultivars i.e Rezeiz, Khnazi and Bkerah. The Central region Riyadh, Kharj and Al-Qassem) was represented also by three date cvs i.e. Khudri, Shagra and Sullga. The Southern and Al-Madena region was represented by another three date cvs: Sefri, Kusbah and Barni. The date fruits were cleaned, pitted, packed in 1 kg plastic bags and kept refrigerated prior to further treatment and analysis.

In date candy processing, date paste was used and mixed with desiccated coconut and roasted groundnut. Date paste was prepared from the above nine date cultivars (Shagra, Kusbah, Sefri, Rzeiz, Khudrii, Bkerah, Khnazi, Barni and Sullag) as mentioned earlier by Yousif et al. (1996).

Date candy preparation:

Date candy was prepared using the following ingredients; date paste, 40 – 60%; roasted groundnut 20 – 30% and dessicated coconut 20 – 30%. The mixed candy paste was passed through a meat grinder to

obtain a homogenized paste. The homogenized candy paste was formulated and shaped manually using a cookie decorating tool. Some of the prepared date candies were kept plain whereas the rest was coated with chocolate. Chocolate chips after being melted in a water bath was used for coating purposes. Plain and chocolate coated date candies were kept for 2 hours in a cold storage before being packed and stored for further studies.

Three variables were covered during the preparation of date candy i.e. the date paste / nuts ratio, the suitability of nine Saudi date cultivars for candy making and the storability of the prepared date candy.

The effect of date paste / nut ratio and chocolate coating on the quality and acceptability of the produced date candy:

In studying this variable, Rezeiz date were used in preparing the date paste needed. Three date paste / nuts ratios were used: 40/60, 50/50 and 60/40. The nuts were desiccated coconut and roasted groundnut and were used in equal portions for each recipe. A total of six date candy samples were prepared; three of them were plain whereas the other three were chocolate coated. The produced date candies were then tested sensorily by performing ranking preference test as recommended by Larmond (1982). The six date candy samples after being coded were given to a panel of 16 semi – trained judges at the Date Palm Research Center with the ranking preference test. Sheet. The sheets were collected and scores were calculated and accordingly the best date paste ratio either with or without chocolate coating was determined.

Effect of date cultivar on the quality of the produced date candy:

The same date cultivars mentioned above were used in this study. Since the 60/40 date paste / nut ratio (chocolate coated) was the candy preferred by the judges, this ratio was used to study this variable. The coded chocolate coated date candy representing the date cultivars and were divided into 3 groups. Each group with a reference sample which was an imported candy bar (Mars) available in the local market was given to a panel of 16 followed. The test sheets were collected and the scores were calculated and tabulated. The candy of the two date cultivars attaining the best scores was selected and used for further studies.

Effect of storage on the properties of date candy:

According to the results of the date cultivar variable, two date candy samples prepared from Rezeiz and sullag date were evaluated and

judged as the best. The two date cultivars were used in preparing large quantities of candy (5 kg for each).

The prepared candy was chocolate coated, cooled, packed and stored at room temperature (25 + 5°C). The chemical, physical, and sensory properties of date candy either at fresh stage or after being stored up to 4 months were determined.

Methods of analysis:

Moisture, ash, total soluble solids (Brix), pH, total acidity as tartaric acid, and protein were determined using the standard A.O.A.C. methods (AOAC, 1990). Minerals were analyzed using a Perkin Elmer atomic absorption spectrophotometer model 3030. Color was measured using an extraction procedure as described by Maier and Schiller (1960). The sugar monomers were determined by high pressure liquid chromatography (HPLC) as described by Yousif (1989). The ranking preference test as well as the multiple comparison difference test as recommended by Larmond (1982) were followed to determine the sensory properties of the prepared date candy. Ranking test was used where preference between samples was required, whereas multiple comparison test was used to evaluate the effect of the cultivar variable as well as the storability variable. Semi-trained panel from the Date palm Research Center were used as the candy evaluators.

Data were analyzed by analysis of variance using the SAS system of the University of Jordan Computer Center, where F values were significant, the Duncan multiple range test was used to show the significant differences between the means.

RESULTS AND DISCUSSION

Effect of date paste/nut ratio and chocolate coating:

Three ratios of date paste were used to cover this variable i.e. 40,50, and 60%. The other ingredients were desiccated coconut and roasted groundnut. The nuts were used in an equal proportions and constituted 60, 50, and 40% of the three recipes; respectively. As it is clear from Table 1, the date candy sample which was chocolate coated and contained 60/40 paste/nuts ratio gained the best scores and as a result was used in the further experiments regarding the date candy study.

Table 2 presented the results regarding the effect of date cultivars on the quality and acceptability of the prepared date candy. It is obvious from these results that the candy prepared from Rezeiz and sullag dates

were evaluated as the best, and accordingly, they were used in the storability study.

The chemical, physical and sensory properties for both Rezeiz and Sullag candy either as fresh or after 8 or 16 weeks storage time were presented in Tables 3 and 4. Results in Table 3 show that Rezeiz date candy had a lower pH value than either Sullag date candy or the imported Mars. On the other hand, Rezeiz date candy had higher values of pigment concentration and protein compared with Sullag date candy. However, a close similarity could be observed between the two date candies with respect to their moisture, ash, sugar and fiber contents. As far as the imported Mars was concerned, results in Table 3 show that the total sugar content of the Mars was higher than that of the date candy. At the same time the sugar composition of the Mars was widely different from those of the date candy. While the date candy contained almost equal amounts of the three sugars i.e. fructose, glucose and sucrose, the Mars contained lower levels of fructose and sucrose and higher glucose level. This might be attributed to the high level of corn syrup used in manufacturing the imported candy. With regard to the acceptability of the two date candies, the sensory evaluation results showed that Rezeiz date candy was more acceptable than the Sullag candy. Storage time significantly affected the pH of the stored date candy as indicated by the results given in Table 4. A pronounced decrease could be noticed in the pH of the date candy.

Regarding the color (pigment concentration) of the date candy, it is evident from Table 4 that the color of Sullage candy was not affected by storage time, whereas Rezeiz candy was slightly affected. These variation in the color results might be attributed to the lack of homogeneity of sampling since date candy was chocolate coated and any variation in the chocolate portion was expected to create such problems. It is clearly shown from the storability study results that storage duration had a pronounced effect on the sensory properties of the date candy. After 16 weeks storage time, date candy was not acceptable and gained a mean score which was equivalent to poor and slightly inferior to the reference. However, the drawback in the sensory properties of Rezeiz candy was moderate and lower than that of Sullag candy, since it was judged slightly inferior than the reference (the imported Mars).

It could be seen from Table 4 that the fructose and glucose content of the date candy tended to increase as a function of storage duration, whereas sucrose tended to decrease. These results of the sugar composition might be explained on the basis of sucrose inversion due to acid environment in the date candy and to the relatively high storage temperature.

CONCLUSION

It could be concluded from the results of this study that there is a good possibility for utilization of surplus dates in candy making. The produced date candies were evaluated as better than the imported Mars and were characteristics of high nutritive value. The storability study results revealed the possibility of storing date candy at 25 °C up to 8 weeks without affecting their good quality attributes.

REFERENCES

- AOAC. 1990. Official Methods of Analysis, 15th edn. Washington, D.C. Association of Official Analytical Chemists.
- Larmond, F. 1982. Laboratory methods for sensory evaluation of food. Canada Dept. of Agriculture. 1982.
- Maier, V.P. and Schiller, F.H. 1960. Studies on domestic dates. I. Methods for evaluating darkening. Food Technology, 14, 139-142.
- Sawaya, W.N., H.A. Khatchadourian, J.K. Khalil and A.S. Mashadi, 1983. Processing of three major date varieties grown in Saudi Arabia into jam. J. Food Sci & Technol. (India), 20 (4): 149-152.
- Statistical Yearbook. 1994. Central Department of Statistics, Ministry of Finance and National Economy, Riyadh, Saudi Arabia.
- Yousif, A.K., A.F. Alshaawan, M.Z. Mininah and S.M. Eltaisan. 1987. Processing of date preserve, date jelly and date jutter. Date Palm J., 5 (1), 73-86.
- Yousif, A.K., A. 1989. Processing of date paste and its utilization in bread making. Ph.D. Thesis. King's College, London, U.K.
- Yousif, A.K., A.S. Alghamdi, A. Ahmad and A. I. Mustafa. 1996. Processing and evaluation of a date juice milk drink. Egyptian J. Dairy Sci., 24, 277-288.
- Yousif, A.K.. 1995. Processing, shelf-life and evaluation of plain and chocolate coated date bars Food Sci. & Technology Today 8 (4), 243-245.

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Table 1. Sensory evaluation scores for six date candy samples either plain or chocolate coated prepared using different date paste ratios

Panelist	Date candy samples code					
	5	310	101	215	71	410
1	5	6	4	3	2	1
2	4	2	5	3	6	1
3	6	5	4	3	2	1
4	4	2	5	3	6	1
5	5	4	6	2	1	3
6	3	5	2	6	1	4
7	3	6	2	5	1	4
8	4	5	2	6	1	3
9	6	3	5	1	2	4
10	3	2	6	1	5	4
11	6	2	5	1	4	3
12	5	1	3	4	5	2
13	6	1	4	3	5	2
14	3	5	1	4	2	6
15	1	5	6	2	4	3
16	2	1	4	3	5	6
Total	66 a	55 b	64 a	50 c	53 b	48 c

- Plain date candy prepared using 40% date paste was coded 5; chocolate coated date candy prepared by using 40% date paste was coded 310; plain date candy prepared using 50% date paste was coded 101; chocolate coated candy prepared by using 50% date paste was coded 215; plain candy prepared using 50% date paste was coded 71 while the chocolate coated candy prepared using 60% date paste was coded 410.

** Totals having the same letters are not significantly different.

* Table 2. Sensory evaluation scores for date candy samples prepared using different date

Panelist No.	Date candy samples codes and cultivars								
	560 SH	417 KS	134 SR	310 RZ	440 KD	601 BK	74 KH	26 SG	123 BR
1	4	4	2	1	2	4	6	2	3
2	5	6	3	2	3	5	3	2	2
3	5	6	7	2	5	5	5	5	7
4	5	8	5	8	4	8	9	8	5
5	5	5	6	2	5	8	9	4	6
6	6	5	4	5	4	6	7	4	7
7	5	3	5	5	6	4	5	1	2
8	4	4	6	4	4	4	2	1	3
9	3	2	7	2	2	2	5	2	2
10	2	3	6	2	4	3	3	3	6
11	1	2	6	1	2	2	5	2	3
12	4	5	4	6	8	5	5	6	3
Total	49 e	53 d	61 b	40 f	49 e	56 c	64 a	40 f	48 3
Mean	4.08	4.42	5.08	3.33	4.08	4.67	5.33	3.33	4.00

• Cultivars:

SH – Shagra; KS – Kusbah; SR – Sefri; RZ – Rezeiz

KD – Khudri ; BK – Bkerah; KH – Khnazi; SG – Sullag

Totals having the same letters are not significantly different

Table.3. Chemical ,physical , and sensory evaluation of fresh date candy

Composition	Values means		
	Rzeiz date candy	Sullag date candy	Imported Mars
Moisture %	12.34 a	12.28b
PH	5.96c	6.16b	6.26a
Ash %	1.89b	2.0a
Protein %	8.89a	7.94b
Color (mg pigment/g dry matter)	3.0a	2.6 b
Total sugar %	40.1b	37.6c	51.4a
Sucrose %	12.5a	11.4b	7.8c
Fructose %	13.2a	12.3b	5.7c
Glucose %	14.5b	13.9c	38.4a
Fiber %	5.25b	5.45a
Sensory evaluation (mean scores)	2.80	3.10a
K (mg/100g)	1042a	1043a	230a
Ca (mg/100g)	294b	258c	366a
Mg (mg/100g)	218a	182b	100c
Na (mg/100g)	208b	200b	280a

Means having the same letters in the same row are not significantly different

Table 4. Effect of storage on chemical, physical and sensory properties of date candy

Composition	Date bars	Storage period (wk)		
		0.0	8	16
Moisture %	Rezeiz date candy	12.3a	10.1c	10.3b
	Sullage date candy	12.3a	10.8c	11.2b
pH	Rezeiz date candy	5.96a	5.73a	5.4b
	Sullag date candy	6.16a	5.87b	5.60c
Color (mg pigment/g dry matter)	Rezeiz date candy	3.00c	3.50b	3.60a
	Sullag date candy	2.60a	2.40b	2.60a
Total sugar %	Rezeiz date candy	40.1c	41.5b	43.9a
	Sullag date candy	37.6c	40.6b	43.5a
Sucrose %	Rezeiz date candy	12.5a	11.2b	4.4c
	Sullag date candy	11.4b	11.7a	9.8c
Fructose %	Rezeiz date candy	13.2c	13.8b	17.9a
	Sullag date candy	12.3c	12.9b	16.5a
Glucose %	Rezeiz date candy	14.5c	16.5b	19.9a
	Sullag date candy	13.9c	16.0b	17.5a
Sensory evaluation (mean scores)	Rezeiz date candy	2.80b	2.70b	5.30a
	Sullag date candy	3.10C	3.40B	7.0a

Means having the same letters in the same row are not significantly different

المخلص

تناولت هذه الدراسة التعرف على الظروف المثلى لتصنيع حلويات اصابع التمور وكذلك على مدى ملائمة تسعة اصناف من التمور السعودية لصناعة الحلويات وصلاحيه الحلويات المصنعة للخرن. أشارت النتائج إلى أن حلويات التمور المصنعة بإضافة عجينة التمور إلى المكسرات بالنسبة ٦٠ : ٤٠ (عجينة / مكسرات) مع التغطية بالشيكولاته قد حصلت على أعلى الدرجات. كما كانت تمور الرزيز والسلج الاكثر ملائمة من غيرها لصناعة حلويات اصابع التمور. دلت نتائج الدراسة الخزنية على أن الخزن على درجة حرارة الغرفة (٢٥ + ٥س) لمدة تزيد عن ٨ أسابيع قد أضر بأغلب صفات جودة تلك الحلويات.

أشارت نتائج تقييم اصابع التمور بعد خزنها لمدة ١٦ اسبوعا من قبل فريق المحكمين على أنها ذو جودة منخفضة ولاترقى الى جودة المارس المستورد. أن مثل هذه النتائج قد تعزى إلى التأثير السئ لدرجة حرارة الخزن المرتفعة نسبيا، وبناء على نتائج هذه الدراسة ينصح بخرن اصابع التمور على درجة حرارة منخفضة (١٠ - ١٥ م).