

CHARACTERISTICS AND ACCEPTANCE OF YOGURT CONTAINING DATE PALM PRODUCTS

Isameldin Bashir Hashim

**Food Science and Nutrition Department, Faculty of Agricultural sciences, United Arab Emirates University,
P. O. Box 17555 Al Ain, UAE**

ABSTRACT

Yogurt was prepared by adding date palm paste (Paste) and date palm syrup (Depis) to cultured milk. The main objective was to investigate the influence of paste and depis on chemical characteristics (pH, titrable acidity, total solids, fat, and protein content), sensory quality (color, firmness, smoothness, sourness, sweetness, flavor, and taste) and acceptability of yogurt. Seventy female students evaluated yogurt quality using 9-point hedonic scale. Addition of 10 to 20% paste with or without 5% depis did not affect yogurt pH or protein and fat content, but decreased moisture and increased the total solids significantly. Addition of 15% paste and 5% depis provided yogurt with desired sensory quality.

Additional Index Words: Date paste, depis, yogurt, sensory quality, acceptability.

INTRODUCTION

The date palm (*Phoenix dactylifera* L.) is the major fruit tree in United Arab Emirates. In the Gulf region, in spite of the drastic socio-economic changes, dates continue to play an essential role in the diet of the local people. Dates fruits consumed in large quantities in UAE. Date is eaten at all stages of the fruit development (khalal, rutub, and tamr). In addition to direct consumption, dates are processed in many ways, including the production of date paste and date syrup, depis, (Mohamed and Ahmed, 1981). The production and marketing of these products have increased steadily in recent years. Date paste and depis are incorporated in several products including jam, preserve, jelly, and chuntney (Mustafa et al., 1983, Sawaya et al., 1983, Yousif et al., 1987, and Sawaya et al., 1989), candy (Yousif and Al-Gahamdi, 1998) and date bars (Yousif, 1995). Depis was used to produce date juice and date juice milk drink (Ramadan, 1998 and Yousif et al., 1996), ice cream (Hamad et al., 1983), caraml color (Mikki et al., 1983), and tamr-eddin, substitute for Qumerdeen, (Sumainah and El-Nakhal, 1984). Dates or date products

provide unique functionality when used with other products including sweetening, flavoring, and increasing nutritional quality.

Yogurt is a pasteurized milk coagulated to a custerlike consistency with a mixed lactic acid culture containing *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. It is most often flavored with fruit preserves or other ingredients (Potter and Hotchkiss, 1995). The objective of this study was to investigate the influence of date paste and depis on chemical characteristics (pH, titrable acidity, total solids, fat, and protein content), sensory quality (color, firmness, smoothness, soureness, sweetness, flavor, and taste) and acceptability of yogurt.

MATERIALS AND METHODS

Yogurt making

Preliminary trials were conducted to prepare yogurt containing date paste and depis similar to the commercial flavored yogurt and to determine the highest levels of date products to be added. Commercial pasteurized, homogenized full cream cow milk (Al Rawabi Farm, Dubai), Khalas date paste and depis (Al Ain Date Factory, Al Ain) were used to make yogurt. Results showed that depis should not exceed than 5% and paste can be added up to 20% of the yogurt. Commerical yogurt was used to prepare yogurt containing date products. Three levels of date paste (10, 15, and 20%) and two level of depis (0 and 5%) were used to prepare the yogurt. Yogurt containing date products were compared to a control yogurt (commercial plain yogurt).

Chemical analysis

The pH was measured using a pH meter. Titrable acidity was determined as lactic acid by titrating with 0.1 N NaOH using phenolphthalein as an indicator (Karleskind et. Al., 1993). Total solids content was determined in a laboratory oven at 105°C for 24 hr, total fat was analyzed by Soxhlet Method, and total protein was assayed by Kjeldahl (AOAC, 1990).

Sensory evaluation

A panel of 70 consumers was recruited from the female campus (Almaqam), United Arab Emirates University, Al Ain, UAE. Criteria for selection of participants were (1) they eat yogurt at least once a week and (2) they were not allergic to dairy products. Consumers were asked to fill

a demographic/ yogurt and date consumption questionnaire. Consumers were instructed on how to do the tasting test. Water was provided for cleansing the palate between samples. A 9-point hedonic scale with 1 = dislike extremely and 9 = like extremely (Larmond, 1980) was used for rating color, firmness, smoothness, taste, sweetness, sourness, flavor, and overall acceptance. Yogurt samples were served in plastic plates identified with three-digit code number.

Statistical Analysis

Statistical analysis was performed by using the general linear model (GLM) procedure of Statistical Analysis System (SAS Institute, 1988). The least significant difference test (LSD) was used to test differences between means ($P \leq 0.05$).

RESULTS AND DISCUSSION

Demographic and yogurt consumption characteristics of participants are presented in Table 1. All participants were females between ages 18–23. Fifteen percent of panelists were married. All participants eat yogurt at least once a week and 19% eat yogurt on a daily basis. Most of the participants (94%) eat flavored yogurt. All consumers eat date fruit and use date paste and depis with different food products.

Means for chemical composition (pH, acidity, moisture, protein, fat and total solids) of yogurt containing date products are presented in Table 2. Yogurt containing date paste and depis had similar acidity and pH values of plain yogurt. Addition of date products had no effect on fat and protein content, while decreased moisture content and increased total solids of the yogurt.

Mean hedonic ratings for color, firmness, smoothness, taste, sweetness, sourness, flavor, and acceptability of yogurt containing date products are presented in Table 3. Plain yogurt and yogurt containing up to 20% date paste and 5% depis had similar ratings for firmness. Yogurt containing date paste with or without depis had significantly lower ratings for smoothness (6.9 – 7.4) compared to plain yogurt (8.6). Addition of up to 20% date paste had no effect on yogurt ratings for color (7.4 – 6.9), sourness (6.8 – 5.8), and flavor (6.4 – 5.6). Although, addition of 5% depis to the yogurt containing date paste decreased the ratings for color (6.1 – 6.5) and sourness (5.0 – 5.2) significantly and increased flavor ratings (7.2 – 7.8) significantly. Yogurt containing 15% date paste or 10 – 20% date paste plus 5% depis had significantly higher ratings for taste

(8.2 –8.6). While addition of 10% date paste and 5% depis or 15 - 20% date paste with or without depis had high sweetness ratings (6.4 –8.3) which were significantly different compared to plain yogurt (5.2). Yogurt containing 5% depis had significantly higher sweetness ratings (7.4 – 8.3) compared to yogurt containing only date paste (5.8 – 6.8). Yogurt containing 15% date paste or 15% date paste and 5% depis had the highest acceptability ratings (8.2 – 8.4).

In summary, participants found the sensory attributes of yogurt flavored with date products to be very acceptable. Yogurt containing 15% date paste and 5% depis had better taste and flavor.

ACKNOWLEDGMENTS

The author would like to thank the Research Council at UAE University for funding the project, Al Ain Date Factory for providing date paste and syrup, Al Rawaby Company for providing milk, culture and making the yogurt. Special thanks to Ms. Aisha A. Hussein for technical assistance and all students who participated on the sensory tests.

REFERENCES

- AOAC. 1990. Official Method of Analysis, 15th Ed. Association of Official Analytical Chemists. Washington, D.C.
- Hamad, A. M., M. I. Mustafa, and M. S. Al-Kahtani. 1983. Possibility of utilizing date syrup as sweetening and flavoring agent in ice cream making. In Proceedings of the First Symposium on Date Palm in Saudi Arabia, King Faisal University, Al-Hassa (pp. 544-550). Riyadh, Saudi Arabia: Mars Publishing House.
- Karleskind, D., I. Laye, and F. V. Morr. 1993. Chemical, biological and sensory properties of plain non-fat yogurt. *J. Food Sci* 58(5): 991-995.
- Larmond, E. 1980. Methods for sensory evaluation of foods. Publication No. 1284. Ottawa, Canada, Department of Agriculture. Pp. 36.
- Mikki, M. S., V. Bukhaev, F. S. Zaki. 1983. Production of caramel color from date juice. In Proceedings of the First Symposium on Date Palm in Saudi Arabia, King Faisal University, Al-Hassa (pp. 552-558) Riyadh, Saudi Arabia: Mars Publishing House.
- Mohamed, M. A. and A. A. Ahmed. 1981. Libyan date syrup (Rub Al-Tamar). *J. Food Sci.*, 46: 162-166.

- Mustafa, A. I., M. A. Hamad, and M. S. Al-Kahtani. 1983. Date varieties for jam production. In Proceedings of the First Symposium on Date Palm in Saudi Arabia, King Faisal University, Al-Hassa (pp. 496-501) Riyadh, Saudi Arabia: Mars Publishing House.
- Potter, N. N. and J. H. Hotchkiss. 1995. Milk and Milk products in Food Science. 5th Ed. Chapman & Hall, New York, NY.
- Ramadan, B. R. 1998. Preparation and evaluation of Egyptian date syrup. In Proceedings of the First International Conference on Date Palms, United Arab Emirates University, Al-Ain (pp. 86-99), University Publishing House.
- SAS Institute. 1988. SAS[®] User's Guide: Statistics. Version 6.03 Ed. SAS Institute Inc., Carry, NC.
- Sawaya, W. N., H. H. 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.
- Sawaya, W. N., H. H. Khatchadourian, J. K. Khalil, and A. F. Al-Shalhat. 1989. Processing of date into date chuntney. In Proceedings of the Second Symposium on Date Palm in Saudi Arabia, King Faisal University, Al-Hassa (pp. 105-111) Riyadh, Saudi Arabia: Mars Publishing House.
- Sumainah, G. M. and H. El-Nakhal. 1984. Tame-Eddin: Anew product of date. J. Food Sci. Technol., 21: 88-91.
- Yousif, A. K. 1995. Processing, shelf-life and evaluation of plain and chocolate coated date bars. Food Sci. & Technol. Today, 8 (4), 243-245.
- 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. and A. S. Alghamdi. 1998. Suitability of nine Saudi date cultivars for candy making. In Proceedings of the First International Conference on Date Palms, United Arab Emirates University, Al-Ain (pp. 100-110), University Publishing House.
- Yousif, A. K., A. S. Alghamdi, A. Ahmed and A. I. Mustafa. 1996. Processing and evaluation of date juice milk drink. Egyptian J. Dairy Sci., 24 : 277-288.

Table 1. Demographics and yougurt and date consumption of participants (n=70)

Demographics/Consumption	% Responding
Age	
18 – 20 (yrs)	35.71
21 - 23 (yrs)	55.71
> 23 (yrs)	8.58
Marital Status	
Single	85.71
Married	14.29
How frequently do you eat yougurt?	
Daily	18.57
3 to 2 times/week	67.14
Once a week	14.29
Do you eat flavored yogurt?	
Yes	94.29
No	5.71
Do you eat dates?	
Yes	100.00
Do you use date paste?	
Yes	100.00
Do you use date syrup (depis)?	
Yes	100.00

Table 2. Chemical composition of yogurt containing date paste(P) and date syrup/depis(D)

Yogurt	pH	Moisture %	Protein%	Fat%	Total Solids %	Acidity (Lactic acid %)
Plain yogurt	4.62a ¹	85.91a	3.55a	4.22a	14.1c	0.98a
Yogurt-10% (P)	4.66a	79.43b	3.45a	4.16a	20.6b	0.96a
Yogurt-15% (P)	4.64a	77.18b	3.38a	4.10a	22.9b	0.96a
Yogurt-20% (P)	4.55a	77.72b	3.22a	4.10a	22.3b	0.94a
Yogurt-10% (P) + 5% (D)	4.46a	75.94bc	3.15a	3.98a	24.1b	0.90a
Yogurt-15% (P) + 5% (D)	4.58a	74.19c	3.13a	3.90a	25.9b	0.89a
Yogurt-20% (P) + 5% (D)	4.61a	69.37c	2.99a	3.87a	30.7a	0.87a

¹ Means within a column not followed by a common letter are different ($P \leq 0.05$).

Table 3. Sensory quality and acceptability¹ of yogurt containing date paste(P) and date syrup/depis(D), (n=70)

Yogurt	Color	Firmness	Smoothness	Taste	Sweetness	Sourness	Flavor	Acceptability
Plain yogurt	7.4a ²	6.5a	8.6a	7.6b	5.2c	6.8a	5.6b	7.2b
Yogurt-10% (P)	7.2a	6.1a	7.4b	7.8b	5.8bc	6.0a	5.6b	7.0b
Yogurt-15% (P)	7.2a	6.0a	7.2b	8.3a	6.4b	5.8ab	5.8b	8.2a
Yogurt-20% (P)	6.9a	6.1a	6.9b	7.8ab	6.8b	5.8ab	6.4ab	7.4b
Yogurt-10% (P) + 5% (D)	6.5b	5.8a	7.5b	8.2a	7.4a	5.2b	7.2a	7.4b
Yogurt-15% (P) + 5% (D)	6.5b	5.6a	7.2b	8.6a	7.9a	5.2b	7.8a	8.4a
Yogurt-20% (P) + 5% (D)	6.1b	5.6a	7.0b	8.4a	8.3a	5.0b	7.6a	7.7ab

¹ 9-point hedonic scale was used with (1) = dislike extremely and (9) = like extremely.

² Means within a column not followed by a common letter are different ($P \leq 0.05$).