

Processing, Evaluation and Storability of Date Katter "A New Product of Date"

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ABSTRACT

The possibility of processing date katter including its optimum processing conditions, its physico-chemical, sensory properties and its storability have been studied. The sensory evaluation revealed the possibility of processing date katter of good quality, superior to the similar imported products. The chemical composition of the processed date katter was as follows : Brix : 73%; pH : 3.92; water activity (a_w) : 0.76 and total sugar 70.37 %. Storage of glass jar packed date katter for six months at room temperature ($25\pm 5^\circ\text{C}$) caused a slight decrease in its moisture content, (a_w) and a significant decrease in pH values. Pigment concentration tended to increase significantly with increasing time. Sucrose inversion was clearly evident as a function of storage duration. The sensory evaluation indicated the possibility of storing date katter up to six months without affecting its good quality attributes in spite of some changes.

Key Words : Date processing, physico-chemical properties, product development, sensory evaluation, storage,

INTRODUCTION

Seventy five percent of the world date production is produced in five countries : Saudi Arabia, Iraq, Egypt, Iran and Algeria. Most of these dates are used directly for human consumption with less than 10% of the product is processed (Barreveled, 1971). Recently, more attention is being given to the improvement and development of date processing, and new date packing and processing plants were established. Furthermore, new products such as date syrup, vinegar, alcohol and liquid sugar are successfully marketed. However, substantial quantities of dates are lost annually due to lack of efficiency in the marketing operation and also to pest infestation.

Several investigators reported about incorporating of dates in different food products such as bakery items (Al-Zubaidy et al., 1983; Yousif et al., 1991a), beverages (Yousif et al 1986); candy (Sawaya et

al 1983a; Yousif et al 1987a); jam (Sawaya et al 1983b, Yousif et al. 1987b) and jelly (Yousif et al., 1990). The possibility of processing an acceptable date pickle has been also reported (Yousif et al., 1985).

The substantial quantities of dates available in Saudi Arabia and other Middle East countries, their popularity among whole population, their high nutritive value (Yousif 1991b) and their high level of inverted sugar justify the processing of date katter and its use as a replacer for maple syrup and other similar imported syrups which accounted for \$ 12 million for the year 1987 (Statistical yearbook, 1987).

The present work deals with the development of a new date product "date katter" and covers its proper processing conditions, chemical composition sensory properties and storability.

MATERIALS AND METHODS

Materials

Date fruits of the Ruzeiz variety were obtained from the Hofuf date market, Saudi Arabia. The date fruits were cleaned, pitted and soaked in sufficient water at 25°C for 3 min. The soaked dates were allowed to drain for 10 min. and ground at moderate speed in a Kraft grinder, model A2-3. Sucrose and citric acid used in processing the date katter were purchased from the local market whereas commercial pectin was of BDH grade.

Methods

Preparation of date katter

Date juice was prepared by adding water to the produced date paste at the ratio of 3:1 (w/w). The mix was boiled gently with continuous stirring for 5 min. Filtration was carried out using cheese cloth.

Date katter was prepared on laboratory scale by boiling date juice and addition of sugar at the ratio of 1.6:1 and 1:1 (w/v) sugar / date juice. Boiling was continued until a brix of 70 to 72 was reached. Citric acid was dissolved in a small quantity of the hot syrup and was added to the boiling mix. Boiling was continued for 3 min. and pectin was added after being dissolved in the hot syrup as in citric acid. Boiling was continued for another 5 min.

Four samples of date katter were prepared with a code number of 280, 290, 300 and 310. The prepared samples were sensory evaluated for their color, flavor and texture. Large quantities of date katter sample no 280 were produced, filled in glass jars and were stored for 0, 2, 4, and 6 months at 25°C for storage stability studies.

The effect of storage time on the physico-chemical properties (Moisture, pH, water activity, color and sugar content) and sensory qualities (color, flavor, and texture) of the date katter were also studied.

Physico-chemical properties

Moisture, pH and total soluble solids (brix values) were determined following the standard methods of AOAC (AOAC, 1984). Color was measured using the extraction procedure described by Maier and Schiller (1960). The sugar monomers were determined using the HPLC technique as described by Yousif (1989). The date katter sugars were extracted by 80% ethanol; extraction was filtered and analysed in a LKB 2150 HPLC equipped with a LKB 2142 refractive index detector and a recording integrator (model LKB2220). An Ultropack column, TSK NH2-60, 5 μ m, was used for the separation of sugar using the eluent acetone /ethyl acetate/ water (55/35/15 respectively). The integrator was programmed; zeo: 0, Att: 7, Cht speed: 0.5, PK width: 0.5, Thrsh: 7, AR Rej : 0. The flow rate was adjusted to 1 ml/min. A calibration mixture of sucrose/glucose/fructose (8/8/8 mg/ml) was used as the standard and the normal calibration procedure was used to determine the amounts of each sugar. Water activity (aw) was determined using the standard salt solution method (D'Alton, 1966).

Sensory evaluation

The date katter samples were evaluated for sensory qualities (overall acceptability including color, flavor, and consistency) at the time of preparation and after storage using the multiple comparison difference test as recommended by Larmond (1982). Coded samples of date katter were given to a panel of 10 judges. An imported katter sample was selected as control and was labeled R. The judges were asked to test the date katter samples to show whether they are better than, equal to or inferior than the control. The scoring sheet also included the extension of difference. Numerical scores were assigned to the ratings with "no difference" equaling 5, "extremely better than R" equaling 1 and "extremely inferior than R" equaling 9. Analysis of variance of the scores was then conducted.

Statistical analysis

Data were analysed using SAS computing system (SAS, 1982). The analysis of variance procedure was used and the LSD values were calculated for all means.

RESULTS AND DISCUSSIONS

Preparation of date katter samples

The recipe for the prepared date katter samples is presented in Table 1. The brix values for the prepared katter samples ranged for 76.10 to 77.50, whereas the pH values ranged between 3.35 and 3.92. Some variation observed in the sugar/date juice ratio, pectin and citric acid included in the formula of the prepared date katter samples. These variations, however, were reflected on the sensory qualities of the prepared katter samples. Katter sample no. 280 achieved the best scores because of its attractive color, good texture and flavor.

Chemical composition of date katter

The results of the chemical analysis of the date katter (sample no. 280) and an imported katter available in the Saudi market is presented in Table 2. Date katter had a lower moisture, pigment concentration (color) and pH values compared with the imported katter. Furthermore, the brix and total sugar values of date katter were higher than those imported one. It is interesting to note the variation in the sugar composition between the two types of katter. The imported katter contained high levels of maltose whereas date katter contained no maltose. These results indicate the possibility to use the corn syrup in preparing the imported katter. The incapability of the NH2-60 column attached to the PHLC system to separate the dextrans may account of the lower figures for sugar in the imported katter.

Table 1. Recipes for date Katter

Ingredients	Sample Code number			
	280	290	300	310
Sugar/date juice ratio	1.6:1	1:1	1:1	1:1
Pectin %*	1.0	1.0	1.0	0.0
Citric acid %*	0.5	0.8	0.8	0.8
pH of final product **	3.92	3.44	3.35	3.35
	± 0.035	±0.008	±0.012	±0.018
Brix of final product **	77.10	76.10	77.50	76.40
	±1.212	±1.420	±1.230	±1.133
Sensory evaluation scores ***	2.0a	2.20a	2.35a	2.30a

*Added as percentage (w/v) of the date syrup

** Mean ± standard deviation

*** Means with the same letters are not significantly different

Table 2 also shows that the prepared date katter has a good stability from microbial point of view since it has aw value less than 0.80 which is considered a safe limit for such products (Troller and Christian, 1978).

Storage stability

The effect of storage time on the quality parameters of date katter is illustrated in Figs 1-5. It is clear from fig. 1 that storage up to months had no effect on the moisture content of date katter, whereas a slight, although statistically significant ($p < 0.05$) change observed in water activity values (fig. 2). A marked increase was noticed in the pigment concentration after 6 months of storage time (Fig. 3). However, the increase in darkening is expected and might be attributed to nonenzymatic browning reactions that a function actively in moderate moisture foods (Troller and Christian 1978). A pronounced decrease could be seen in the pH values of date katter as a function of storage time. Similar results were also observed in the pH of date paste and date jelly (Yousif et al, 1990, 1991c). In regard to sugars (Fig 5) it is easy to note the sucrose inversion process as a function of both the acidic conditions of the product and storage time. As a result, sucrose content decreased while fructose and glucose contents increased.

Table 2. The physico-chemical properties of date* katter and imported katter (on fresh wt basis)

Composition**	Values mean***	
	date katter	imported katter
Moisture %	24.66 ± 0.847	27.1 ± 0.765
Brix %	73.00 ± 0.416	69.80 ± 0.530
Water activity	0.763 ± 0.006	ND
pH	3.92 ± 0.040	5.46 ± 0.035
Color (mg pigments per 100 g sample)	1.63 ± 0.032	2.31 ± 0.028
Total sugar %	70.37 ± 1.928	35.12 ± 0.966
Fructose %	13.60 ± 0.705	16.20 ± 0.820
Glucose %	14.09 ± 0.110	6.26 ± 0.08
Sucrose %	42.67 ± 1.114	2.42 ± 0.040
Maltose %	0.0	10.24 ± 0.540

* Sample no. 280

** Mean of three determinations with a c.v. value less than 5%.

*** Mean ± standard deviation

Sensory evaluation

The statistical analysis of the sensory evaluation data did not show any significant differences ($P < 0.05$) between the fresh and stored samples indicating that the date katter was still acceptable after 6 months storage time at 25°C inspite of the changes occurred in some of its quality attributes specially to the color.

These results highlight the possibility of processing a new date product, "date katter" which may aid in alleviating the date processing problem.

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