Suitability of Some Date Cultivars for Jelly Making

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The optimum processing conditions as well as the suitability of nine Saudi date cultivars for jelly making have been standardized. The storability of the prepared date jelly was also studied. The results showed that the 50/50 date juice/sugar ratio gave the best jelly. It was also found that 'Sefri' and 'Barni' dates were more suitable than the other seven cultivars for jelly making. Storage at room temperature (25±5°C) up to 32 weeks had no effect on pH, moisture, "Brix, acidity and sensory properties of the prepared date jelly. While a slight increase was observed in the colour intensity of the stored date jelly, a marked change was noticed in its sugar composition. However, the 32 weeks stored date jelly was still acceptable and was rated as equal to a fresh imported apple jelly. 

Keywords: Date cultivars, Jelly making, Storage, Physico-chemical properties, Sensory evaluation.

Materials and Methods

Jellies made from a variety of fruits are popular among the local population. There are different types of fruit jellies other than dates available in the market, most of which are imported.

Methods of preparation for jellies of different toughness characteristics are well documented (USDA 1974; Salonke et al. 1991; AFRC 1989; Woodroof and Luh 1986; Anon 1981). Factors affecting setting temperature and setting time of pectin jellies were reviewed by Ahmad (1981). Furthermore, Freedman and Francis (1984) studied the effect of ascorbic acid on the colour of jellies. They found that the addition of ascorbic acid to strawberry, apple and orange jelly did provide a lighter coloured product. Yousif et al. (1987) investigated the possibility of processing jelly from Saudi dates. The pH and "Brix values for the prepared date jellies were in conformity with Saudi standards for jam and jellies (SASO 1980). The results showed that the prepared date jellies possessed high quality attributes and were well accepted by the panel members.

The optimum processing conditions i.e., ingredients, pH and "Brix for processing of date jelly were also carried out by Yousif et al. (1990). The prepared date jelly samples were packed in glass jars and stored up to 24 weeks at 25°C. The effect of storage on the chemical and sensory properties of the date jellies was conducted.

Since dates are rich in sugars and other important nutrients and there is a surplus of second quality dates, this study was undertaken to prepare date jelly and recommend the most promising date cultivars for this industry.

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juice/sugar ratio, effect of date cultivar and storage on jelly.

Effect of date juice/sugar ratio on the quality of the produced jelly: In studying this variable, 'Rezeiz' dates were used in preparing the date juice. Three levels of date juice/sugar ratios were selected i.e., 50/50; 75/25; and 100/0.0. After processing, the three date jelly samples were coded and given to a panel of 10 judges, who evaluated the quality of the jelly by ranking preference test.

Effect of date cultivar on the quality of the produced date jelly: The same nine date cultivars as mentioned before were used to study this variable. According to the date juice/sugar ratio variable results, the 50/50 date juice/sugar ratio was used in preparing the jelly samples. Date jelly samples were prepared from the juice of the date cultivars, then coded and evaluated in terms of °Brix and pH and sensory qualities. The nine date jelly samples were divided into two categories. Each group with a reference sample, which was an imported apple jelly available in the local market was given to a team of 12 panelists. The multiple comparison difference test as recommended by Larmond (1982) was followed. Jellies of the two date cultivars attaining the best scores were selected and used for the storage studies.

Effect of storage on the quality attributes of date jelly: Ten kg each of 'Barni' and 'Sefri' date jellies were prepared, mixed well before being filled hot in glass jars and cooled. The jars were stored at room temperature (25±5°C) up to 22 weeks. The physico-chemical and sensory properties of the freshly as well as the stored jellies (0.0, 4, 8, 16 and 32 weeks) were determined.

Moisture, ash, total soluble solids (°Brix), pH, total acidity as tartaric acid, and protein were determined using the standard AOAC (1990) methods. Minerals were analyzed using a Perkin Elmer atomic absorption spectrophotometer (model 3030). Colour 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).

Data were analyzed by analysis of variance using the SAS system of the University of Jordan Computer Center. Duncan multiple range test was used to determine the significant differences between the means (SAS, 1987).

Results and Discussion

The results regarding the processing of date jelly on laboratory scale are presented in Tables 1-3.

Effect of date juice/sugar ratio on the quality of the prepared date jelly: A preliminary evaluation was carried out for the jellies prepared using three date juice/sugar ratios (50/50, 75/25 and 100/0.0). It is obvious from this experiment that sucrose is an essential ingredient in jelly making. In the 100/0.0 date juice/sugar treatment, a product of an unacceptable consistency and colour was obtained. The situation was better with the 75/25 treatment and a product with an acceptable colour and consistency was produced. Using the ratio 50/50 date juice/sugar, an excellent product having an attractive colour and good consistency was obtained. Accordingly, the ratio 50/50 date juice/sugar was used in the following experiments of the date jelly study.

Effect of date cultivar on the quality of date jelly: The second studied variable was the suitability of a selected date cultivar for jelly making. The °Brix

<table>
<thead>
<tr>
<th>Date cv</th>
<th>Code</th>
<th>°Brix</th>
<th>Sensory evaluation scores</th>
<th>Values means*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Date</td>
<td>Date</td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>juice</td>
<td>jelly</td>
<td></td>
</tr>
<tr>
<td>'Shagra'</td>
<td>560</td>
<td>20.50</td>
<td>66.50</td>
<td></td>
</tr>
<tr>
<td>'Kusbah'</td>
<td>914</td>
<td>17.50</td>
<td>68.50</td>
<td></td>
</tr>
<tr>
<td>'Sefri'</td>
<td>134</td>
<td>19.40</td>
<td>68.50</td>
<td></td>
</tr>
<tr>
<td>'Resler'</td>
<td>310</td>
<td>18.60</td>
<td>68.30</td>
<td></td>
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<tr>
<td>'Khudri'</td>
<td>440</td>
<td>17.50</td>
<td>64.70</td>
<td></td>
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<tr>
<td>'Saker'</td>
<td>601</td>
<td>17.40</td>
<td>65.50</td>
<td></td>
</tr>
<tr>
<td>'Rhaz'</td>
<td>74</td>
<td>17.60</td>
<td>67.90</td>
<td></td>
</tr>
<tr>
<td>'Sullag'</td>
<td>26</td>
<td>19.50</td>
<td>68.10</td>
<td></td>
</tr>
</tbody>
</table>

* means having the same letters in the same column are not significantly different.
for the prepared date juices ranged from 17.4 for 'Bkerah' date juice to 20.6 for 'Barni' date juice. The processed date jellies had 'Brix values ranging 64.7 to 68.5, whereas their pH values ranged between 2.86 and 3.11 (Table 1). These 'Brix and pH values, however, were in agreement with the Saudi standards for jam and jelly making (SASO 1980). It is evident from the sensory evaluation scores (Table 1) that the two date cultivars, 'Sefri' and 'Barni', gained the best scores. As a result, the date juices of these two date cultivars were used in preparing large quantities of jelly for the storage studies.

Storability of the date jelly: Tables 2 and 3 show the analytical data regarding the third studied variable (storability of date jelly) i.e., the chemical, physical, and sensory evaluation results for both 'Barni' and 'Sefri' date jellies either as fresh or after 4,8,16 and 32 weeks of storage. Table 2 also has the analytical data for an imported apple jelly, which was used as a reference in studying the sensory properties of the date jelly throughout this study.

'Barni' date jelly had almost the same characteristics as those of the 'Sefri' date jelly. This means that the date cultivars did not significantly (P>0.05) affect the chemical, physical and sensory properties of the prepared date jelly.

It is also interesting to observe the close similarity in many of the chemical properties (Table 2) of the date jelly and those of the imported apple jelly. The similarities can be detected in the pH, total sugar content, magnesium, sodium and calcium contents. On the other hand, some differences could be observed between the date jelly and the imported apple jelly with regard to their colour, sugar composition and sensory properties. Lower darkness (0.49) was the characteristic of the apple jelly compared with date jelly (1.19-1.35 mg pigment/g dry matter). The date jelly also contained more sucrose and potassium and less fructose and glucose than the apple jelly.

Data on the sensory evaluation (Table 3) reveal that the panelist gave a mean scores of 3.3 to 3.9, which were rated as good. This means that the panelists preferred date jelly as moderately better than the imported apple jelly.

Results in Table 3 show that storage at room temperature (25±5°C) up to 32 weeks had no effect on the moisture, pH, 'Brix, titratable acidity and the sensory properties of the prepared date jelly. Slight
increase could be observed in the colour intensity, whereas marked changes could be seen in the sugar composition. However, these changes were expected and might be ascribed to the sucrose inversion process. Fortunately, the 32 weeks stored jelly was still acceptable and was rated as equal to a fresh imported apple jelly.

It may be concluded from the study that there is a good possibility for utilization of surplus dates in jelly making. The date jellies prepared were rated better than the imported jellies and had characteristics of high nutritive value as compared with the Saudi standards. The results of the storage study revealed the possibility of storing date jelly at 25°C upto 32 weeks without affecting their quality.

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