EVALUATION AND UTILIZATION OF SOME EGYPTIAN PUMPKIN (Cucurbita moschata) CULTIVARS

Al-Barbary, F. S.; A. H. Khalefa; Safaa A. Mohamed and E. A. Abdel-Rahman
Food Science & Technology Dept., Fac. Agric., Assiut Univ., Assiut, Egypt

ABSTRACT

Four Egyptian pumpkin (Cucurbita moschata) cultivars namely: Qena, Edwa, Kafr-Saad and Kafr-El-Batikh were used in this study. The objective of this study was carried out to evaluate physical properties, chemical composition, mineral contents, beta-carotene as well as ascorbic acid contents of the fruits. Beside, preparation and evaluation of pumpkin flour, pumpkin marmalade and Qamar El-Din sheets product containing 10, 20 and 30% of pumpkin pulp. From physical properties data, there are differences in fruit shapes and weight of seeds per fruit among the studied cultivars.

The pulp constituted ranged from 70 to 71.53%; peel from 26.49 to 27.99%; and seed from 0.27 to 1.67% of fruits weight. The moisture content of fruits ranged from 91.33 to 94.88%, crude protein content from 0.60 to 1.35%; crude fat from 0.14 to 0.15%; crude fiber from 0.34 to 0.55%; Ash content ranged from 0.45 to 0.90% and carbohydrate from 3.59 to 5.68% (on wet weight basis).

The mineral salts analysis indicated that pumpkin fruits are rich source of potassium (K) which ranged from 2350 to 2540 mg/100g on dry weight. Beta-carotene content ranged from 18 to 106 mg/100g (on dry weight basis) while, Vitamin C content ranged from 2.3 to 29.7 mg/100g of fresh fruits.

Chemical composition of the prepared pumpkin flour indicated its high contents of protein, ash and crude fibers and could be a good complement for wheat flour as well as its used as a source of beta-carotene and yellow color supplement in bakery products. The highly organoleptic evaluation of the prepared pumpkin marmalade could be encourage to use this crop for producing marmalade, jams and preserves as a good application. An acceptability of panelists with no significant differences in taste and flavor between control and Qamar El-Din sheets product containing 10% of pumpkin pulp and could be produce this famous product in Arabic countries with lower price as well as find an other new use for pumpkin fruits.

Keywords: Cucurbita moschata, pumpkin, chemical composition, beta-carotene, Ascorbic acid and Application uses.

INTRODUCTION

Pumpkins belong to genus Cucurbita of the family Cucurbitaceae are grown throughout the tropical and sub-tropical countries (See et al., 2007). There are three common types of pumpkin world-wide, namely Cucurbita pepo, Cucurbita maxima and Cucurbita moschata (Lee et al., 2002). Five major pumpkin producing countries in the world are China, India, Ukraine, Egypt and United States, Fang, (2008). In 2008, 651,859 metric tonnes of pumpkin was produced in Egypt. Geisler,(2010)

The yellow-orange characteristic colour of pumpkin is due to the presence of carotenoids. Pumpkins provide a valuable source of carotenoids
and ascorbic acid, which have major roles in nutrition as provitamin A and as an antioxidant, respectively (See et al., 2007).

Consumption of foods containing carotene helps prevent skin diseases, eye disorders and cancer (Bendich, 1989). Jun et al., (2006) found that in C. moschata D. high amount of pectin, carotene, vitamins, minerals and other substances beneficial to human health. Squash is cultivated throughout the world for use as vegetable as well as medicine. It has been used traditionally as medicine in many countries such as China, Yugoslavia, Argentina, India, Mexico, Brazil and America. Cucurbita moschata is popular used in several countries to control diabetes as well as for treating worms and parasites (Noelia et al., 2011). Pumpkin are consumed in various ways such as fresh or cooked vegetable, as well as being stored frozen or canned (Figueroedo et al., 2000).

Pumpkin can be processed into flour, which has a longer shelf-life and used to supplement cereal flours in bakery products, for soups, sauces, instant noodle and spice as well as a natural coloring agent (See et al., 2007). Composite flour is a binary or ternary mixture of wheat flour with flour from some other crops (Shittu et al., 2007).

Utilization of composite flour in food products reduces the use of wheat by partial or total substitution of wheat flour. This could be an economic advantage to those countries depending on import to meet the demand for wheat flour (Noor Aziah and Komathi. 2009). However, knowledge of nutritive value of local dishes, soup ingredients and local foodstuffs is necessary in order to encourage the cultivation and consumption of those that are highly nutritive (Achu et al., 2005).

According to (Noelia et al., 2011), deferent researches agree in indicating that more scientific studies are needed to achieve greater and better utilization of this important crop. Beside the available information about the Egyptian cultivars are very scanty. This work is, therefore, aimed to evaluation the physicochemical properties of flour Egyptian pumpkin cultivars as well as preparation and evaluation of pumpkin flour, pumpkin marmalade and Qamar El-Din apricot sheets (a famous product in Arabic countries) containing 10, 20 and 30% of pumpkin pulp.

MATERIALS AND METHODS

Materials

200 kg of ripe pumpkin (cucurbita moschata) of four Egyptian cultivars namely: Qina, Edwa, Kafr-Saad and Kafr-El-Battikh were obtained from the farm of faculty of agriculture, Assiut University, at season of 2009. The fruits were washed and random five fruits were used for determination the physical properties of the studied pumpkin cultivars. The fruits were manually pulped with a knife to remove the peel and seeds, then the pulp was cut into small cubics, homogenized for analysis or filled in polyethylene bags and kept at 20±2˚c until used.

Apricot and orange peel samples as well as commercial orange marmalade and Qamer El-Din sheet were collected from local markets at Assiut city.
Analytical Methods:

Gross chemical composition:

Moisture content, crude protein (% N x 6.25), crude fat, crude fiber and ash were determined in pumpkin samples as well as pumpkin flour according to AOAC (1995) standard method. Carbohydrate content was determined by the difference.

Determination of minerals:

Determination of minerals by a Flame Photometer 410, spekol11 spectrophotometer and Atomic Absorption Spectrophotometer. In the Soil & Water Department; Faculty of Agric. Assiut University, as described in A.O.A.C. (1995).

Determination of β-carotene:

β-carotene was determined by high performance liquid chromatography (HPLC) according to the method of Pupin et al. (1999). A 5 g homogenized sample of pumpkin was extracted with ethyl acetate (3×50 ml) containing 0.004% butylated hydroxytoluene (BHT). The organic phase was transferred through 50 g anhydrous sodium sulphate and collected in an ambered round bottom flask. To the aqueous residue 50 ml of methanol was added (containing 0.004% BHT) followed by 100 ml of 1M NaCl. The solution was well mixed and further extracted with ethyl acetate (75 and 25 ml, containing 0.004% BHT). The ethyl acetate fractions were then transferred through the sodium sulphate and combined with the previous extracts.

Finally, sodium sulphate was washed with a further 50 ml of ethyl acetate (0.004% BHT). The pooled ethyl acetate was evaporated to dryness in a rotary evaporator at 40°C. The extract was transferred quantitatively to a 10 ml volumetric flask using portions of 1.5 ml of mobile phase (acetonitrile : methanol : 1,2 dichloroethane, 60: 35:5, v/v/v). The injection standard (100 µl, Sudan I, 50 mg/liter in acetonitrile) was added and the volume was made up to 10 ml.

The HPLC apparatus consisted of a Waters 625 LC System, equipped with an auto sampler Gilson 231XL and a Spectra Focus UV-Vis detector (Spectra Physics). A100 µl loop was used for injection. Solvents were HPLC grade. The mobile phase was a ternary mixture of acetonitrile: methanol: 1,2 dichloroethane (60:35:5, v/v/v) to which 0.1% BHT, 0.1% triethylamine and 0.05 M of ammonium acetate (in methanol) was added. The column was a C18 Vydac 201TP54 5 µm (250×4.6 mm id., Vydac) with a guard-column Altima C18 5 µm (7.5×4.6 mm id., Alltech). The wavelength was adjusted to 450 nm. The peaks were measured by a Millennium Software v.2.0 (Waters). Peak identity was confirmed by a Spectra Focus Scanning Detector (Spectra Physics).

Determination of Ascorbic acid (V. C):

The concentration of ascorbic acid in pumpkin samples were measured following the direct method described by Romeu-Nadal et al. (2006). For this purpose, DL-dithiothreitol was used to reduce dehydroascorbic acid to ascorbic acid. The latter was resolved by reversed-phase high-performance liquid chromatography using a mobile phase of Milli-Q water with acetic acid (0.1% v/v) and methanol in a relative proportion of 95:5 v/v. The analytical
column used was a Tracer Spherisorb ODS2 C18 (250 × 4.6 mm ID, 5 μm particle size) protected with a guard column (Tracer, C18, 5 μm), both from Tracer Analitica (Tecknokroma, Barcelona, Spain). An UV–Vis detector, SPD-10 AV VP (Shimadzu, Kyoto, Japan) and an HP-3365 Series II Chemstation were used. Ascorbic acid was identified by comparing the retention time of the sample peak with that of the ascorbic standard at 254 nm.

Technological methods:
Preparation of pumpkin flour:
The cubic pumpkin pulp sample were sliced and dried at 55˚C in a moved air oven for 24 hours. The dried sample were milled and reweighed, then kept chilled in an air-tight containers.
Preparation of marmalade:
Pumpkin in marmalade was prepared according to the method of Egbekun et al.,(1998) with some modification. Briefly, about 2 kg of the prepared pumpkin pulp was mashed in 1 liter of water (1: 0.5 w/v pulp: water ratio) and boiled at 100 °C for 20 min. The boiled mixture was mixed by blender for 2 min. and clarified through a stainless steel sieve to extract the juice.

About 800 g of sugar were added to 1.8 liters of the extracted juice and added 0.2% citric acid. The extract was concentrated in a stainless steel pot at 102 °C for 30 min to 68.5 °Brix (TSS %). The slices of orange peel were added to the mixture at the end of boiling process. The hot (87 °C) marmalade is filled in sterile glass bottles, allowing 1 cm headspace and stored at 28 ± 2 °C for 7 days.

Preparation of Qamar El Din:
Qamar El Din ingredients were apricot and water (650g+150ml). Qamar El Din products were supplemented with 10, 20 and 30% prepared pumpkin pulp. The product were manufactured as follows: the mixture was boiled for 10 min, mixed by a blander, and clarified through a stainless steel sieve, then the mixture was boiled again and 0.2% citric acid was added. This mixed was spread on aluminum trays and dried in a hot air oven at 55 °C for 24 hours.

Sensory evaluation:
Sensory evaluation of prepared pumpkin marmalade and Qamer El-Din sheets products were performed by a panel of ten judges. The order of presentation of the samples to the panel was randomized. The samples were descriptively characterized, pointing out the most relevant sensory characteristics (Sidel and Stone, 1976).

Statistical analysis:
The analysis of variance (ANOVA) was performed on all values using the statistical analysis system (SAS) version 6.12 (SAS, 1997). The level of significance was set at 0.05.

RESULT AND DISCUSSION

Physical properties of pumpkin fruits
The four Egyptian studied pumpkin cultivars are shown in Figure (1) and the physical properties of its in Table (1). As shown in Figure (1) there are different shapes for pumpkin cultivars.
The same observation was reported Lira and Monten (1992), who quote that the fruits of this specie of vegetable may have different sizes, color and forms. Fruit shape of pumpkin (*cucurbita moschata*) also, varied from rind, flat round oval and oblong type according to Pandey *et al.* (2003).

The results in Table (1) indicated that, the weight of the fruits ranged between 4.18 to 6.36 kg and the height of the fruits ranged from 24.37 to 45.67 cm and the diameter ranged between 16.07 to 23.53 cm. while thickness of the pulp were ranged between 2.57 to 7.60 cm. However, Pandey *et al.* *(2003)*) found that, the fruits weight from 1.25 to 9 kg, polar circumference ranged from 43 to 85 cm, equatorial circumference ranged from 43.33 to 95 cm with 2-5 cm thick liesh. From the data of Table (1) it could be noticed that the pulp, peel and seeds constituted 71.53, 27.99, 0.27%; 71.25, 26.49, 1.11%; 70.10, 27.32, 1.65% and 71.07, 26.57, 1.67% of the fruits of Qina, Edwa, Kafr-Saad and Kafr-El-Batikh, respectively. These values were in the same line of the results of Jacobo-Valenzuela *et al.* *(2008)* and Aguilar-Gutierrez *et al.* *(2009)* who found that the range of pulp ratio of C. moschata was 71.75-86.06% and ratio of shell 8.20-13.89% but they reported a high range for seeds 2.7-5.89%.

On the other hand, the data in Table (1) indicated that there were in significant differences among the four studied cultivar in their contents of seeds. However, Kafr-Saad and Kafr-El-Batikh cultivars consider a good source of seeds among the studied cultivars, while, Qina cultivar was poor in their content of seed. Beside, that data about physical properties may be useful for the food industrial uses of pumpkins.

![Figure 1: Egyptian pumpkin cultivars.](image-url)
Table 1: Physical properties of four Egyptian pumpkin cultivars.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Qina</th>
<th>Edwa</th>
<th>Kafr-Saad</th>
<th>Kafr-El-Batikh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit weight (kg)</td>
<td>04.18b</td>
<td>04.87ab</td>
<td>05.82ab</td>
<td>06.36a</td>
</tr>
<tr>
<td>Height of the fruit (cm)</td>
<td>45.67a</td>
<td>43.07a</td>
<td>24.37b</td>
<td>44.93a</td>
</tr>
<tr>
<td>Diameter of Fruit (cm)</td>
<td>16.07c</td>
<td>22.50a</td>
<td>23.53a</td>
<td>18.00c</td>
</tr>
<tr>
<td>Thickness of the pulp (cm)</td>
<td>07.60a</td>
<td>02.57c</td>
<td>04.07b</td>
<td>03.87c</td>
</tr>
<tr>
<td>weight of Seed (g/fruit)</td>
<td>11.47d</td>
<td>54.17c</td>
<td>96.03b</td>
<td>106.03a</td>
</tr>
<tr>
<td>Number of seeds/fruit</td>
<td>83.00a</td>
<td>195.00c</td>
<td>445.00a</td>
<td>393.00b</td>
</tr>
<tr>
<td>Weight of peel (kg/fruit)</td>
<td>01.75a</td>
<td>01.29ab</td>
<td>01.59a</td>
<td>01.69a</td>
</tr>
<tr>
<td>Weight of Pulp (kg/fruit)</td>
<td>02.99a</td>
<td>03.47ab</td>
<td>04.08ab</td>
<td>04.52a</td>
</tr>
</tbody>
</table>

Values with different subscripts on the same row are significant (p<0.05)

Gross chemical composition of the studied pumpkin fruits:

The proximate compositions of the studied pumpkin cultivars are shown in

Table 2. The moisture content ranged from 91.33 to 94.88%. Similar results were reported by Ana (1998); Rahman et al. (2008) and Noelia et al. (2011) who stated that moisture content were 93.2, 92.89 and 94 (g/100g), respectively. However, Kafr-Saad cultivars recorded the highest value of moisture while, Kafr-El-Batikh recorded the lowest one and no significantly, differences were observed between Qina and Edwa cultivar in their contents of moisture.

The protein content of the studied pumpkin cultivars ranged from 0.60 to 1.35%. The values were in agreement with that reported by Ana (1998); Jirapa et al. (2006) and Noelia et al. (2011)..

Data represented in

Table 2 indicated that crude fat content was about 0.15% in all studied cultivars with no significant differences. The results are very close to those reported by See et al. (2007).

The data also, indicated that the crude fiber contents ranged from 0.34 to 0.55%, ash contents ranged from 0.45 to 0.90% and carbohydrate contents from 3.59 to 5.68%. Similar results were reported by See et al. (2007); Rahman et al. (2008) and Usha et al. (2010).

Table 2: Gross chemical composition of the studied pumpkin fruits (g/100g on wet weight)

<table>
<thead>
<tr>
<th>Estimates</th>
<th>Qina</th>
<th>Edwa</th>
<th>Kafr-Saad</th>
<th>Kafr-El-Batikh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>93.39a</td>
<td>93.00a</td>
<td>94.88b</td>
<td>91.33c</td>
</tr>
<tr>
<td>Crude protein</td>
<td>1.05a</td>
<td>1.14a</td>
<td>0.60b</td>
<td>1.35c</td>
</tr>
<tr>
<td>Crude fat</td>
<td>0.15a</td>
<td>0.14a</td>
<td>0.15a</td>
<td>0.15a</td>
</tr>
<tr>
<td>Crude Fiber</td>
<td>0.44a</td>
<td>0.46ab</td>
<td>0.34a</td>
<td>0.55a</td>
</tr>
<tr>
<td>Ash</td>
<td>0.61a</td>
<td>0.68b</td>
<td>0.45c</td>
<td>0.90a</td>
</tr>
<tr>
<td>Carbohydrate’</td>
<td>4.36a</td>
<td>4.57a</td>
<td>3.59b</td>
<td>5.68c</td>
</tr>
</tbody>
</table>

Values with different subscripts on the same row are significant (p<0.05)

*Calculated by differences
Minerals content:

The results of determination of minerals content of the four studied pumpkin cultivars are presented in Table (3). The data indicated that, all studied cultivars were rich in their content of potassium element which was ranged from 2300 to 2540 mg/100g on dry weight basis. Similar result was reported by Jacobo-valenzuela et al., (2011), who found that average potassium content in C. moschata was 42194 mg/kg. The same trend was also indicated by Rahman et al.,(2008). On other hand, the result of sodium content in this study (70-110 mg/100g dry weight) was much lesser than 7040.30±4.92 mg/100g of fluted pumpkin pulp which reported by Egbekum et al.,(1998).

Data in Table 3 also revealed that, Kafr-Saad and Kafr-El-Batikh cultivars were higher in their contents of P, Mg, Ca, Na, Fe and Zn than that of Qina and Edwa cultivars. However, no wide variation between all studied cultivars in their contents of Cu and Mn. On other hand, cadmium (Cd) element was absent in the all studied pumpkin in cultivars.

Table 3: Minerals composition of pumpkin fruits (mg/100g on dry weight)

<table>
<thead>
<tr>
<th>Minerals</th>
<th>Qina</th>
<th>Edwa</th>
<th>Kafr-Saad</th>
<th>Kafr-El-Batekh</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>2300</td>
<td>2480</td>
<td>2540</td>
<td>2350</td>
</tr>
<tr>
<td>P</td>
<td>150</td>
<td>150</td>
<td>270</td>
<td>660</td>
</tr>
<tr>
<td>Mg</td>
<td>80</td>
<td>60</td>
<td>140</td>
<td>180</td>
</tr>
<tr>
<td>Ca</td>
<td>70</td>
<td>90</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Na</td>
<td>80</td>
<td>70</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Fe</td>
<td>0.108</td>
<td>0.134</td>
<td>0.157</td>
<td>0.155</td>
</tr>
<tr>
<td>Zn</td>
<td>0.019</td>
<td>0.020</td>
<td>0.029</td>
<td>0.030</td>
</tr>
<tr>
<td>Cu</td>
<td>0.013</td>
<td>0.015</td>
<td>0.015</td>
<td>0.015</td>
</tr>
<tr>
<td>Mn</td>
<td>0.004</td>
<td>0.003</td>
<td>0.005</td>
<td>0.008</td>
</tr>
<tr>
<td>Cd</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

β-carotene and Ascorbic acid contents:

β-carotene and ascorbic acid contents of the studied pumpkin cultivars are shown in Table (4). Data indicated that Qina cultivar recorded the highest value of beta-carotene (106mg/100g dry weight) and Kafr-El-Batikh cultivar recorded the lowest value (18 mg/100g dry weight). However, Edwa and Kafr-Saad cultivars recorded intermediate levels (64 and 82.8 mg/100g dry weight, respectively). Seo et al.,(2005) reported that the major carotenoid in pumpkin (>80%) is beta carotene and pumpkin is rich source of beta carotene and might be useful for preventing vitamin A deficiency. According to Munteen and Muntean (2005) the beta carotene content of cucurbita maxima was 164.29 µg/g dry weight. On other hand, the results of Egyptian pumpkin cultivars (except of Kafr-El-Batikh cultivar) were higher than that of Danmhat Maettol cultivar grown in Korea which recorded 58.2 mg/100g of freeze-dried pumpkin powder sample on a dry basis as mean value of beta carotene as reported by Lee et al.,(2002). Beta-carotene content was ranged
from 3.1 to 7.0 mg/100g for four cultivars of *Cucurbita moschata* as found by Murkovic *et al.*, (2002).

Data in table 4. Revealed the ascorbic acid content ranged from 2.30 to 29.70 mg/100g on wet weight basis. Two cultivars recorded high value (21.81 and 29.70 mg/100g) of vitamin C (Qina and Kafr-Saad, respectively). While Edwa and Kafr-El-Batikh cultivars recorded low values (2.30 and 3.90 mg/100g, respectively). The high values of vitamin C in Qina and Kafr-Saad cultivars were similar that reported by Walker (1978) and Roura *et al.* (2007) who found that vitamin C in pumpkin was 30 and 22.87 mg/100g, respectively. While the low values of Edwa and Kafr-El-Batikh cultivars were agreement with the results of Sudhakar *et al.*, (2003) and Marina *et al.* (2009). In addition, we can observe that Qina and Kafr-Saad cultivars which were rich in beta carotene content, recorded also high content of ascorbic acid (Table 4).

**Table 4: β-carotene and ascorbic acid composition of the studied pumpkin cultivars**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Cultivars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qina</td>
</tr>
<tr>
<td>β-carotene mg/100g dry weight basis</td>
<td>106.00</td>
</tr>
<tr>
<td>Ascorbic acid mg/100g wet weight</td>
<td>21.81</td>
</tr>
</tbody>
</table>

**Pumpkin flour:**

Gross chemical composition and dehydration ratio of the prepared pumpkin flour are shown in Table 5. The results indicated, that no significant differences in moisture content in the flour prepared from the all studied cultivars which ranged from 11.23 to 11.70%. Similar moisture content (10.96±0.12%) in pumpkin flour was reported by See *et al.*, (2007). However, higher moisture content (14.956%) was reported by Ravi *et al.*, (2010) and lower moisture content in pumpkin powder (6.01%) was found by Pongjanta *et al.*, (2006). Protein content in pumpkin flour ranged from 10.88 to 14.90%; crude fat from 1.57 to 2.30%; crude fiber from 7.95 to 8.69%; ash from 7.84 to 8.66% and carbohydrate from 55.12 to 56.71% (Table 5). The values of protein, ash and fiber in this study were higher than the values reported by Pongjanta *et al.*, (2006) and See *et al.*, (2007). On the other side Ravi *et al.*, (2010) reported that protein content in pumpkin flour was 15.69%. Data in Table 5 indicated that dehydration ratio was high (1:12) in Kafr-El-Batikh cultivar, moderate (about 1:15) in Qina and Edwa cultivars, but relatively low (1:22) in Kafr-Saad cultivar and that reflect its contents of moisture as indicated in table 2. However, in Egypt, wheat flour is often imported to meet local flour needs for bakery products, and the high ash and crude fiber contents in pumpkin flour indicated that this flour could be a good complement for wheat flour in a composite flour blend, as most of the minerals and fiber in wheat flour are lost during milling as indicated by Noor Aziah and Komath (2009). Beside, pumpkin flour could be used as a source of beta-carotene and yellow color supplement in bakery products (Pongjanta *et al.*, 2006).
Table 5: Gross chemical composition and dehydration ratio prepared pumpkin flour

<table>
<thead>
<tr>
<th>Estimates</th>
<th>Pumpkin cultivars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qina</td>
</tr>
<tr>
<td>Moisture</td>
<td>11.23a</td>
</tr>
<tr>
<td>Crude fat</td>
<td>1.98a</td>
</tr>
<tr>
<td>Crude protein</td>
<td>14.23c</td>
</tr>
<tr>
<td>Crude Fiber</td>
<td>8.42c</td>
</tr>
<tr>
<td>Ash</td>
<td>8.66b</td>
</tr>
<tr>
<td>Carbohydrate*</td>
<td>55.48a</td>
</tr>
<tr>
<td>Dehydration ratio</td>
<td>1.1575</td>
</tr>
</tbody>
</table>

Pumpkin marmalade:
Data indicated the organoleptic evaluation of pumpkin marmalade are presented in Table 6. and Fig (2). From such data it could be observed that the pumpkin marmalade had a high score in almost sensory compared with the orange marmalade (control). Sensory evaluation showed no significant difference (at 0.05) in color, taste, flavor, spreadability and overall acceptability between pumpkin marmalade and commercial orange marmalade. Similar results were reported by Egbekun et al.,(1998). The results in Table 6 could be encourage to use this important crop for producing marmalade, jams and preserves as a good application.

Table 6: Mean organoleptic scores of marmalade samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>Color</th>
<th>Taste</th>
<th>Flavor</th>
<th>Consistency</th>
<th>Spreadability</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>4.55a</td>
<td>4.7a</td>
<td>4.5a</td>
<td>4.3a</td>
<td>4.75a</td>
<td></td>
</tr>
<tr>
<td>Pumpkin</td>
<td>4.9a</td>
<td>4.6a</td>
<td>4.6a</td>
<td>4.5a</td>
<td>4.9a</td>
<td>4.8a</td>
</tr>
</tbody>
</table>

**Means within the same column with the same subscript are not significantly different (p > 0.05).

1 = very poor, 5 = excellent

Figure 2: The result of the sensory evaluation scores of marmalade samples
Qamar El-Din sheets:
Qamar El-Din sheets (a famous product in Arabic countries) are manufacture from apricot fruits which relatively had high price. So, in our study Qamar El-Din sheets were prepared containing 10, 20 and 30% of pumpkin pulp and the organoleptic evaluation of the yield sheets are presented in Table 7. Sensory evaluation indicated that there no significant differences in taste and flavor until 10% addition of pumpkin pulp compared to the control. However, the products contained 20 and 30% of pumpkin pulp stay preserve acceptability of the panelists, thus the lowest score was 7.6 of 10 points scale test. This application may be produce Qamar El-Din product with lower price and find an other new use for pumpkin fruits.

Table 7: Mean organoleptic scores of Qamar El-Din products containing 0, 10, 20 and 30% pumpkin pulp

<table>
<thead>
<tr>
<th>Products (Apricot:Pumpkin) ratio</th>
<th>Color</th>
<th>Taste</th>
<th>Flavor</th>
<th>Texture</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (100:0) (control)</td>
<td>9.8a</td>
<td>9.5a</td>
<td>9.4a</td>
<td>9.6a</td>
<td>9.6a</td>
</tr>
<tr>
<td>B (90:10)</td>
<td>8.6b</td>
<td>8.4a</td>
<td>8.7a</td>
<td>8.05b</td>
<td>8.4b</td>
</tr>
<tr>
<td>C (80:20)</td>
<td>8.6b</td>
<td>8.3b</td>
<td>8.1bc</td>
<td>7.9b</td>
<td>8.1b</td>
</tr>
<tr>
<td>D (70:30)</td>
<td>8.1b</td>
<td>7.7b</td>
<td>7.6b</td>
<td>7.7b</td>
<td>7.6b</td>
</tr>
</tbody>
</table>

Means within the same column with the same subscript are not significantly different (p > 0.05).

Conclusion:
Results of this study could be concluded that among studied Egyptian cultivars, Kafr-Saad and Kafr El-Batikh cultivars are good source of seeds. Pumpkin fruits are rich source of potassium and some cultivars had high beta-carotene and ascorbic acid contents. Pumkins can be used in preparing pumpkin flour and high quality pumpkin marmalade as well as added to apricot fruit until 10% for Qamar El-Din sheets product processing.

REFERENCES


Walker N. W. (1978): Fresh Vegetable and Fruit Juices, p. 84.
التقييم والاستفادة من بعض أصناف القرع العسلي المصرية

فضل لللاحا البربر من ملد ملد ليفلة ف صلاف بدال ملد ملد والسيد لي بدالر من قسم لوم وتكنولوجيا الأغذية - كلية الزراعة – جامعة أسيوط، أسيوط مصر

استخدم في هذه الدراسة ررعةة راة مص يةرن يةر اللةرل الةسة ي هةي ل ةو ه ةل التددنةد رامص: قم، الةةده،، فرةر سةةد، فرةر الع ةندف ههةدفا الدراسة  يلةو تلنةنم الخةها  ال عنةنة  ل يةمر هالترفنةةا الفنينةةملإي ال يةةملي هاليدتةةهي اليةةةد ي ل يةةمر هتلةةدنر يدتةةهي ال يةةمر يةةر العنتمفةةمرهتنر (ج)ف

وظيرت تناج الخواص الطبيعية للمثار وجود اختلاف في أشكال الثمار وأوزانها وزن البذور لكل شعبة الفلاحين والمطر. وشكل النجم (الجزء المركب من النجم) نسبة تراوحت بين 10% إلى 27%، والقشر نسبة تراوحت بين 27.49% إلى 37.49% ونسبة البذور نسبة تراوحت بين 27% إلى 57% من وزن الثمار.

و بالنسبة للتركيب الكيميائي فقد تراوحت نسبة الرطوبة بين 91.32% إلى 94.88%، والبروتين식 الحام في النبات نحو 3.15 %، الدهون الحام في النبات نحو 14.15 %، الألياف الحام بين النبات نحو 3.42 %، والروماتة في النبات نحو 5.52 %، والكربونات في النبات نحو 4.3 %.

وأظهر التحليل الكيميائي للفاكهة المعدنية أن ثمار القرع العسلي عنبر في محتواها من عصر الريوتوم حيث تراوحت كميات مابين 2350 مجم/100 مل/10 مجم إلى 3500 مجم/100 مل/10 مجم (وزن النباتات) ونسبة التروتيات ثمار من البتاكاروتين مابين 18% إلى 40% (وزن النباتات) ونسبة التروتيات نباتية مابين 40% إلى 4.62% (وزن النباتات).

بين التحليل الكيميائي للذين المصنع من ثمار القرع العسلي ارتفاع محتوى من البروتين والمرومات والألياف مما يجعله مكملًا جيدًا لذين الفلاح بالإضافة إلى استخدامه كصدر البذاكاروتين وكمؤس باللون الأصفر من منتجات الخيار.

وأوضح النتائج أن ارتفاع التماثل الحسي للذين المصنع من ثمار القرع العسلي وعدم وجود اختلاف معينة بين بين النباتات العشائرية المصنوعة من ثمار القرع العسلي في إنتاج المرومات وال البروتينات المفيدة للنظام الغذائي، ومن ناحية أخرى أظهر غياب المحتويات في اختبار النتائج مع عدم وجود اختلافات معينة في الطعم والنكهة لمصنوداف القرع العسلي المحتوي على 70% من ثمار القرع العسلي، على إمكانية إنتاج هذا المنتج المميز في البلد العربي بأسعار أقل مع ايجاد طريقة جديدة لإنتاج ثمار القرع العسلي الذي يحتوي معرق من أمراض خاصة بدانة ناجحًا في العالم.

قام بتحقيق البحث

كلية الزراعة – جامعة المنصورة

كلية الزراعة – جامعة أسيوط

أ.د / محمد طه شلبي
أ.د / محمد الدكتور حسن الجداوي