Effect of osmo air drying method on nutritional quality of peach (Prunus persica (L) Batsch.) cultivars during storage

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Abstract: The present investigation was carried out with the objective to develop value added products and to assess the quality parameters of osmo air dried peach slices. The peach slices were dried by osmo air drying method. Dehydrated peach (Prunus persica (L) Batsch.) slices prepared were stored under ambient conditions in polythene packs and subjected to physico-chemical analysis at 45 days interval for a period of 135 days. The highest total sugars were observed in Flordasun 58.28 % and reducing sugars (39.35 %) in Shan-e-Punjab. The maximum acidity (1.84 %) in Shan-e-Punjab, ash content (4.43 %) in Early Grand were recorded. The maximum ascorbic acid content of 11.94 mg/100g was found in Shan-e-Punjab. During storage, an increasing trend was observed in total sugars (54.27-56.76%) and reducing sugars (38.08-39.38%), whereas, acidity (1.85-1.74), ascorbic acid (11.75-9.81mg/100g), and ash content showed decreasing trend. It is thus concluded that Early Grand, Flordasun and Shan-e-Punjab cultivars of peach can be suitably used for preparation of dehydrated peach product using osmo air drying methods.

Keywords: Cultivars, Nutritional quality, Osmo air drying, Peach, Storage

INTRODUCTION

Peach (Prunus persica (L) Batsch.) is believed to be the native of China. It is grown as a commercial and home fruit in most of the temperate countries of the globe. Extensive plantings of peaches occur in Turkistan and Persia. In Japan, peach is among the leading fruits. In USA, peach ranks second only to apple in commercial importance. Peach is grown around the world between 35° and 40° latitude in Asia, Europe, Africa and America (Watson, 1998). The world production of stone fruit is estimated to be about 25 million tonnes per annum, out of which peach contributes 13,757 million tonnes. In India, the introduction of sub-tropical peach started in 1968, though the temperate varieties were already under cultivation in J&K, H.P and U.P (Anonymous, 2011). In India, total production of peach was estimated to about 1,50,000 metric tonnes (FAO, 2006). During last decade cultivation of peach has given some encouraging results in subtropical areas of J&K.

Peach protects us from night blindness, dryness in the skin and formation of ulcer. The peach kernel oil is utilized in manufacturing of large number of cosmetics and pharmaceutical products. Due to seasonal gluts and highly perishable nature, considerable post harvest losses occurs at ambient temperatures. The availability of fruit (seasonal commodities) can be extended by the process of dehydration which acts as a preservation technique. The basic principle of dehydration is the removal of moisture through simultaneous heat and mass transfer, that provide more shelf-life, reduces weight and volume (Yaldiz, 2004). The aim of this work is to study the effect of drying methods viz., osmo air drying, on nutritional quality of dehydrated cultivars of peach during storage. Due to short shelf life of the peach they can be preserved by osmo air drying in order to increase the shelf life and make them available during off season. Osmotic dehydration involves the immersion of foods (fish, vegetables, fruits and meat) in osmotic solution such as salts, alcohols, starch solutions and concentrated sugars, which somehow dehydrates the food (Erle and Schubert, 2001). Different types of solutes such as fructose, corn syrup, glucose, sodium chloride and sucrose are used as osmotic agent for osmotic drying (Azura and Beristain, 2002). Pretreatments like blanching and dipping the fruits in chemicals reduces the drying time and yield a good quality dried product (Piga et al., 2004). The present investigation was conducted to study the effect of osmo-air drying method on nutritional quality of peach (Prunus persica (L) Batsch.) cultivars during storage.
MATERIALS AND METHODS

Three commercial cultivars of Peach viz., Shan-e-Punjab, Floridasun and Early Grande were selected for the present study. The fruits were obtained from the orchards of Division of Fruit Science, Faculty of Agriculture, Sher-e-Kashmir university of Agricultural Science and Technology Jammu. Only mature and blemishes free fruits were selected for the study.

Pretreatments: The fruits were washed in water to remove adherent foreign materials and dust. Peach fruits were dipped in boiling lye solution (2.0 % NaOH) for three minutes. The fruits were then washed thoroughly under tap water. Subsequently, fruits were dipped in 5.0 % citric acid solution for five minutes to neutralize residual alkali from their surface.

Preparation of dehydrated slices: Peach fruits were cut into 4 to 6 pieces. The peach were spread on trays and dipped in sugar syrup (60°Brix for 24 hrs) and then dried at 60±3° C in hot air oven. The final product was packed in 300 gauge polythene pouches and stored under ambient conditions for further studies.

Determination of titratable acidity: Titratable acidity was determined by titrating a known quantity of sample (10 ml) against standard solution of 0.1 N sodium hydroxide to a faint pink colour using phenolphthalein as an indicator. The results were expressed as percent citric acid (Ranganna, 1986).

Ascorbic acid: For estimation of ascorbic acid volumetric method is used. 10 g of sample (10 ml) against standard solution of 0.1 N sodium hydroxide to a faint pink colour using phenolphthalein as an indicator. The results were expressed as percent citric acid (Ranganna, 1986).

RESULTS AND DISCUSSION

Ascorbic acid: There was significant decrease in the ascorbic acid content in dehydrated peach during stor-
age period. At initial day of storage, the highest ascorbic acid content of (13.69 mg/100 g) was recorded in Shan-e-Punjab and lowest (10.57 mg/100g) in Flor-dasun. After 135 days of storage the values decreased to (10.15 mg/100g) in Shan-e-Punjab and 9.64 mg/100g in Flordasun. The decreasing trends in ascorbic acid during storage have also been reported by Rashmi et al. (2005) in osmo-dehydrated pineapple and Gupta (2007) in osmo-dehydrated ber. Muzzafer (2006) also reported the decreasing trend in ascorbic acid in pumpkin candy.

Titratable acidity: At the beginning of storage period, the highest titratable acidity of 1.89 % was recorded in Shan-e-Punjab and lowest (1.81 %) in Early Grande. After 135 days of storage Shan-e-Punjab recorded the highest titratable acidity of 1.78 %. The decrease in titratable acidity might be due to utilization of acids for conversion of non-reducing sugars to reducing sugars. Reductions of titratable acidity during osmosis have also been reported by Gupta (2007) in ber churhara which could be assumed due to leaching of acids during osmosis. Kumar (2013) also reported the decreasing trend in the acidity osmo-dried plum during storage.

Total sugars: It is evident from Table 4 that treatments significantly influenced the total sugar content of dehydrated peach. Among the cultivars, Flordasun recorded the highest value of total sugars 57.25 % followed by Shan-e-Punjab with total sugar content of 54.32 % at initial day. After 135 days of storage, Flor-

Table 1. Effect of cultivar and storage on ascorbic acid (mg/100g) and titratable acidity of osmo air dried peach slices.

<table>
<thead>
<tr>
<th>Storage period (Days)</th>
<th>Ascorbic Acid</th>
<th>Titratable acidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shan-e-Punjab</td>
<td>Early Grande</td>
</tr>
<tr>
<td>0</td>
<td>13.69</td>
<td>11.00</td>
</tr>
<tr>
<td>45</td>
<td>12.25</td>
<td>10.76</td>
</tr>
<tr>
<td>90</td>
<td>11.65</td>
<td>9.95</td>
</tr>
<tr>
<td>135</td>
<td>10.15</td>
<td>9.65</td>
</tr>
<tr>
<td>Mean</td>
<td>11.94</td>
<td>10.34</td>
</tr>
</tbody>
</table>

Table 2. Effect of cultivar and storage on total sugars (%) and reducing sugars (%) of osmo air dried peach slices.

<table>
<thead>
<tr>
<th>Storage period (Days)</th>
<th>Total Sugars (%)</th>
<th>Reducing Sugars (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shan-e-Punjab</td>
<td>Early Grande</td>
</tr>
<tr>
<td>0</td>
<td>54.32</td>
<td>51.23</td>
</tr>
<tr>
<td>45</td>
<td>54.92</td>
<td>52.67</td>
</tr>
<tr>
<td>90</td>
<td>55.28</td>
<td>53.70</td>
</tr>
<tr>
<td>135</td>
<td>55.85</td>
<td>54.26</td>
</tr>
<tr>
<td>Mean</td>
<td>55.09</td>
<td>52.97</td>
</tr>
</tbody>
</table>

Table 3. Effect of cultivar and storage on rehydration ratio and Ash content (%) of osmo air dried peach slices.

<table>
<thead>
<tr>
<th>Storage period (Days)</th>
<th>Rehydration ratio</th>
<th>Browning (OD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shan-e-Punjab</td>
<td>Early Grande</td>
</tr>
<tr>
<td>0</td>
<td>2.95</td>
<td>3.10</td>
</tr>
<tr>
<td>45</td>
<td>2.89</td>
<td>3.08</td>
</tr>
<tr>
<td>90</td>
<td>2.83</td>
<td>3.01</td>
</tr>
<tr>
<td>135</td>
<td>2.76</td>
<td>2.97</td>
</tr>
<tr>
<td>Mean</td>
<td>2.86</td>
<td>3.04</td>
</tr>
</tbody>
</table>
at the initial day. After 135 days of storage Shan-e-Punjab recorded the highest optical density 3.10 minimum optical density 2.47 was recorded in Early Grande. The increase in browning might be due to wide range of residual peroxidases, ployphenoloxi-
dases and lipooxigenase even after blanching, as in green peas (Hulpin and Lee, 1987). An increase in non-
enzymatic browning of date candy was also noticed when stored at room temperature for 60 days (Kumar, 1989).

**Moisture**: At the beginning of storage period, the highest moisture content of 21.07 % was recorded in Flordasun and lowest of 17.10 % in Early Grande. As the storage advances the highest moisture content was recorded 17.50 % in Flordasun and lowest 15.19 % in Early Grande. The mean values of storage period showed decrease from initial value of 19.29 to 16.52 % after 135 days of storage. The decrease in moisture content might be due to natural dehydration of product during storage at room temperature. Similar trend has been reported by Chavan et al. (2010). These findings were in conformity with the findings of Gupta et al. (1980) in ber and Mehta et al. (2005) reported mois-
ture content decreases with an increase in storage pe-
riod lemon peel waste candy.

**Ash**: The ash content of different cultivars decreased significantly during storage. The Early Grande recorded highest ash content 4.68 % followed by 4.42 % in Flordasun and the lowest value 4.18 % was recorded in Shan-e-Punjab. At the end of storage period the Early Grande recorded the highest ash content of 4.18 % fol-
lowed by 4.12 % in Flordasun. The lower ash content is due to increased activities of microorganism utilizing the minerals for growth. Further, the rate of decrease of ash content was more pronounced at ambient temperatures than at cold temperatures (Ashaye et al. 2006). Das and Dutta (2013) reported total ash content in the range be-
tween 2.32 % to 3.29 % in dried ber.

**Conclusion**

It was concluded that Early Grand, Flordasun and Shan-e-Punjab, cultivars of peach can be suitably used for preparation of dehydrated peach product using osmo air drying methods. The storability study re-
vealed that osmo dehydrated peach have good shelf
life and can be kept for more than 135 days without affecting the quality attributes.

REFERENCES


