

Standardization of recipes for preparation of sweet pickle from peach, *Prunus persica* (L) Batsch fruit

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ABSTRACT

Peach, *Prunus persica* (L) Batsch is one of the most important stone fruit grown throughout the world. In the present study peach fruits (cv July Elberta) were evaluated for the preparation of sweet pickle in order to see their suitability and consumer acceptability. For standardization of recipes various combinations of sugar, salt along with fixed quantity of citric acid, acetic acid and spice extracts were tried. End products (pickle) were further packed in pre-sterilized glass jars for storage studies of 90 days under ambient conditions (18 to 28°C). Among various treatments (T₀, T₁, T₂, T₃ and T₄) sweet peach pickle prepared with 5.50 per cent salt and 60°B TSS of syrup (T₁) combination was found to be the best followed by pickle with 6.50 per cent salt and 55°B TSS of syrup (T₂). It was also concluded from storage studies of 90 days that peach pickle with treatment T₁ obtained best scores for the organoleptic quality parameters like colour (7.30), flavour (7.50), texture (7.40) and overall acceptability (7.50) followed by treatment T₂ whereas pickle with treatment T₀ (control) was found to be least acceptable on the basis of sensory evaluation.

Keywords: Peach; pickle; recipe; organoleptic quality parameters

INTRODUCTION

Peach, *Prunus persica* (L) Batsch belonging to the family Rosaceae, genus *Prunus* is widely distributed deciduous fruit plant in the world. In India peach cultivation extends from the northern plains to an elevation of 2000 meters amsl (Soodan et al 1994). Peach fruit is generally grown in Himachal Pradesh, Jammu and Kashmir and Uttarakhand states of the country. Low

chilling peaches are grown in sub-mountainous region, Punjab, Haryana and western Uttar Pradesh. This fruit is found in almost all districts of Himachal Pradesh except in dry and cold regions of the state (Awasthi et al 1990). July Elberta is one of the main cultivars of mid-hill region of the state which accounts for seventy five per cent of the total production of peach fruits in the state. Peaches contain relatively good amount of carbohydrates, proteins,

ascorbic acid, vitamins and minerals in comparison to majority of other common fruits and used for table purpose (Salunkhe and Kadam 1995, Sharma et al 2002 and Negi 2009). This fruit is a potential source of bioactive compounds, carrying medicinal benefits like a potential protection against various chronic diseases (Kim et al 2014). Due to its short life span and perishable nature it needs quick consumption as a fresh fruit or processing into suitable value added products like canned peach halves, nectar, jam and pickle etc. Because of their utilization for canning, peach fruits hold a great contribution to processing industries in Himachal Pradesh. Pickling is another most commonly used method of its preservation. There is little information available on sweet pickling of peach; present investigations were therefore undertaken to standardize recipes for preparation of peach pickle with acid/sugar balance along with appetizing agents which could be a much cheaper alternative for its preservation in comparison to canned peach halves.

MATERIAL and METHODS

Keeping in view the study of Wood Roof and Luh (1986) on sweet peach pickle, fruits of peach cv July Elberta were obtained from the experimental farm of Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan for further processing. Fruits were obtained in the firm, ripe stage and graded. Immediately after

grading, pickling operation was conducted. Standardization of recipes was done to get best blend of sweet peach pickle as per the details given in Table 1. Two kg fruits (for each treatment) were washed and subjected to lye peeling (blanched in 1% boiling sodium hydroxide solution for 1 min, immediately washed with water, dipped in 0.5% citric acid and again washed in water). Fruits were halved by removing the pit, pricked with stainless steel fork for the proper penetration of added ingredients during pickling, heated with sugar and water for about 10 minutes. Citric acid, salt and other ingredients like spice extracts (10 g chopped ginger, 7 g chopped garlic, 10 g black pepper powder, 5 g cumin powder, 7 g large cardamom powder, 5 g fenugreek powder, 3 g clove powder, 3 g cinnamon powder) were added as per given treatments shown in Table 1. In the end required quantity of acetic acid and sodium benzoate were added for preservation. After cooling of products pickles were filled in pre-sterilized glass jars and stored under ambient conditions (18 to 28°C) for further storage studies of 90 days (Fig 1). The observations for different quality attributes were recorded at 0 day and at an interval of 90 days of storage. Fresh fruits and sweet pickle products were analyzed for different physico-chemical and sensory parameters. For the estimation of physico-chemical characteristics, standardized methods and instruments were used. Digital vernier calliper was used to measure the length and diameter of randomly selected

fruits and the average fruit size was expressed in millimeter (mm). Weight of 15 fruits was recorded with the help of electronic pan balance and that of individual fruit was expressed as mean fruit weight in grams (g); the colour of randomly selected fruits was observed visually; the firmness of fresh fruits was measured by penetrometer and expressed in kg/cm²; weight of fresh ten fruits was recorded with the help of electronic pan balance and pulp

to stone ratio was estimated by dividing the pulp weight by stone weight. The moisture and total solids of fresh fruits were estimated by drying the weighed samples to a constant weight in a hot air oven at 70 + 1°C; total soluble solids (TSS) of fresh fruit and samples of sweet peach pickle were measured with the help of Erma-hand refractometer and expressed in degree brix (°B). The titratable acidity was expressed as per cent malic acid (Anon 2004) and

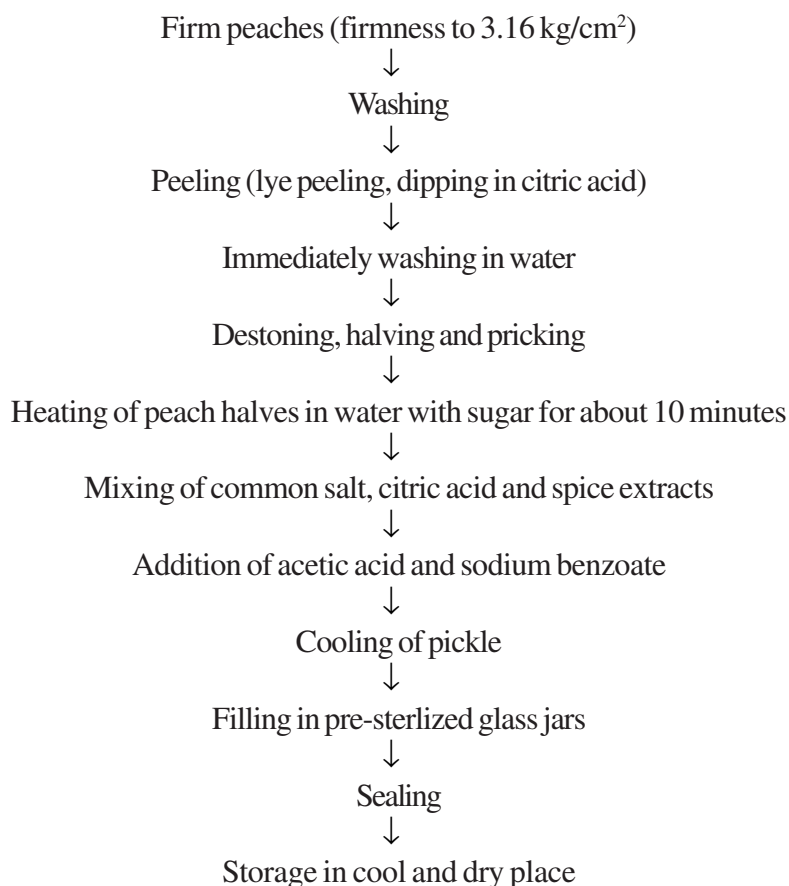


Fig 1. Flow chart for the preparation of sweet peach pickle

Table 1. Treatments used for the standardization of recipe for preparing sweet peach pickle

Treatment (T)	Syrup strength (°B)	Salt (%)	Spice extracts (g)	Citric acid (%)	Acetic acid (%)	Sodium benzoate (ppm)	Water (ml)
T ₀	60.00	-	-	-	-	-	100.00
T ₁	60.00	5.50	50.00	1.00	1.00	250.00	100.00
T ₂	55.00	6.50	50.00	1.00	1.00	250.00	100.00
T ₃	50.00	7.50	50.00	1.00	1.00	250.00	100.00
T ₄	45.00	8.50	50.00	1.00	1.00	250.00	100.00

2.00 kg peach fruits/treatment, 50.00 g spice extracts (10 g chopped ginger, 7 g chopped garlic, 10 g black pepper powder, 5 g cumin powder, 7 g large cardamom powder, 5 g fenugreek powder, 3 g clove powder, 3 g cinnamon powder)

estimated by using phenolphthalein as an indicator to give pink colour (end point). Ascorbic acid content was obtained as per Anon (2004) method using 2, 6-dichlorophenol-indophenol dye. The pH of samples was estimated by using a digital pH meter (CRISON Instrument Ltd, Spain) and reducing, total sugars as per the standard procedures given by Ranganna (2009) and salt content of the samples by direct titration with standard solution of silver nitrate based on standardized Mohr's method (Ranganna 2009).

Consumer acceptance was conducted for pickle by a panel of semi-trained judges who evaluated the product for color, flavour, texture and overall quality on a 9-point hedonic scale in which 1-2 score represented poor, 3-4 fair, 5-6 good, 7-8 very good and 9-10 excellent quality of the sample. Descriptive method for flavour evaluation was used with different descriptors.

RESULTS and DISCUSSION

Perusal of data given in Table 2 shows the average values for length, diameter and weight of peach fruits as 57.40 mm, 58.30 mm and 79.90 g respectively. The visual colour of mature fruits was found to be pinkish to yellowish green. Firmness of fruits was observed as 3.16 kg/cm² whereas pulp to stone ratio was found as 21.20. The average moisture content and total solids in fresh fruits were 87.20 and 12.80 per cent respectively. Average total soluble solids (TSS) in the fruit were recorded as 17.20°B while the reducing and total sugars in the fruits were found to be 2.25 and 12.90 per cent respectively. Titratable acidity, pH and ascorbic acid contents of the fruits were observed as 0.70 per cent (as % malic acid), 4.50 and 16.80 mg/100 g respectively. Similar results in fresh peach fruits have been reported by Gautam et al (1986), Singh et al (1984), Sharma et al (2002), Tandon (2006), Negi (2009) and Forcada et al (2014).

Recipes standardization for peach sweet pickle

Table 2. Physico-chemical characteristics of fresh peach fruit (cv July Elberta)

Physico-chemical characteristic	Mean $\pm$ SE	Physico-chemical characteristic	Mean $\pm$ SE
Weight of fruit (g)	79.90 $\pm$ 4.55	Total solids	12.80 $\pm$ 0.07
Length (mm)	57.40 $\pm$ 0.80	Total soluble solids ($^{\circ}$ B)	17.20 $\pm$ 0.19
Width (mm)	58.30 $\pm$ 0.90	pH	4.50 $\pm$ 0.10
Colour of fruit	Pinkish yellowish green	Titrateable acidity (% as malic acid)	0.70 $\pm$ 0.03
Firmness (kg/cm ²)	3.16 $\pm$ 0.30	Ascorbic acid (mg/100 g)	16.80 $\pm$ 0.45
Pulp to stone ratio	21.20 $\pm$ 0.50	Reducing sugars (%)	2.25 $\pm$ 0.02
Moisture (%)	87.20 $\pm$ 0.90	Total sugars (%)	12.90 $\pm$ 0

SE= Standard error

Table 3. Effect of different treatments on TSS, titrable acidity and salt content of sweet peach pickle during storage

Treatment (T)	TSS (°B)			Acidity (%)			Salt (%)		
	Storage interval (I)		Mean	Storage interval (I)		Mean	Storage interval (I)		Mean
	(Days)			(Days)			(Days)		
	0	90	0	90	0	90			
T ₀	28.00	45.00	36.50	0.65	1.15	0.90	0.30	0.50	0.40
T ₁	29.00	55.00	42.00	2.53	1.80	2.165	3.40	4.30	3.85
T ₂	25.00	51.00	38.00	2.51	1.75	2.13	4.20	5.50	4.85
T ₃	22.00	46.00	34.00	2.50	1.76	2.13	4.60	6.40	5.50
T ₄	20.00	40.00	30.00	2.45	1.70	2.078	4.63	7.30	5.96
Mean	24.80	47.40		2.13	1.63		3.43	4.80	
CD _{0.05}	T= 1.789, I= 1.131, T x I= 2.530			T= 0.036, I= 0.023, T x I= 0.051			T= 0.355, I= 0.224, T x I= 0.502		

Data in Table 3 show that halves of peach pickle of treatment T₀ had 28.00 $^{\circ}$ B TSS, 0.65 per cent acidity and 0.30 per cent salt content respectively. In T₁ TSS of 29.00 $^{\circ}$ B, titratable acidity of 2.53 per cent and salt content of 3.40 per cent respectively were observed. In treatment T₂ TSS,

acidity and salt content were recorded as 25.00 $^{\circ}$ B, 2.51 per cent and 4.20 per cent respectively. In treatment T₃ and T₄ TSS of 22.00 $^{\circ}$ B and 20.00 $^{\circ}$ B, titratable acidity of 2.50 and 2.45 per cent and salt content of 4.60 and 4.63 per cent respectively. It is evident from the data mentioned in Table 3

Table 4. Effect of different treatments on sensory attributes of sweet peach pickle during storage

Treatment (T)	Colour			Flavour			Texture			Overall acceptability		
	Storage interval (I) (days)		Mean	Storage interval (I) (days)		Mean	Storage interval (I) (days)		Mean	Storage interval (I) (days)		Mean
	0	90		0	90		0	90		0	90	
T ₀	7.00	2.90	4.95	6.80	2.60	4.70	7.00	2.70	4.85	7.00	2.80	4.90
T ₁	7.80	7.30	7.55	8.00	7.50	7.75	8.00	7.40	7.70	8.00	7.50	7.75
T ₂	7.60	6.70	7.15	7.50	6.50	7.00	7.00	6.00	6.50	7.50	6.30	6.90
T ₃	6.50	5.30	5.90	6.20	5.20	5.70	6.00	4.70	5.35	6.20	5.00	5.60
T ₄	6.20	4.70	5.45	6.00	4.40	5.20	6.00	4.00	5.00	6.00	4.50	5.25
Mean	7.02	5.38		6.90	5.24		6.80	4.96		6.94	5.22	
CD _{0.05}	T= 0.370, I= 0.234, T x I= 0.523			T= 0.399, I= 0.252, T x I= 0.564			T= 0.384, I= 0.243, T x I= 0.542			T= 0.290, I= 0.183, T x I= 0.409		

that at 0 day TSS was highest (29.00°B) in treatment T_1 and lowest in treatment T_4 (20.00°B). Minor differences in results were seen for titratable acidity of all treatments. Data also shows results after 90 days of storage. Treatment T_0 represented TSS of 45.00°B, titratable acidity of 1.15 per cent and salt content of 0.50 per cent. TSS of 55.00°B and 51.00°B, titratable acidity of 1.80 and 1.75 per cent, salt content of 4.30 and 5.50 per cent were found in treatment T_1 and T_2 respectively. In treatment T_3 and T_4 46.00°B and 40.00°B of TSS, 1.76 and 1.70 per cent of titratable acidity, 6.40 and 7.30 per cent of salt content were observed respectively over 90 days of storage. After storage highest TSS (sugar penetration) was recorded in treatment T_1 (55.00°B) and lowest in treatment T_4 (40.00°B) whereas minor decrease in values were recorded for titratable acidity of treatments T_1 , T_2 , T_3 and T_4 except treatment T_0 after 90 days of storage.

The data of sensory quality attributes of peach pickles which were evaluated by a panel of judges on 9-point hedonic scale are presented in Table 4. Table shows highest scores for color (7.80), flavour (8.00), texture (8.00) and overall acceptability (8.00) in treatment T_1 followed by treatment T_2 at 0 day of storage. Though slight changes in scores for sensory attributes of pickles were seen in all given treatments over a storage period of 90 days (Table 4) but treatment T_1 showed minimum changes in all sensory quality characteristics viz color (7.3), flavour (7.5), texture (7.4)

and overall acceptability (7.5) followed by treatment T_2 . However results showed quite low scores for colour, flavour, texture and overall acceptability in treatment T_0 , T_3 and T_4 .

The data on physico-chemical attributes of peach pickle showed that after 90 days there was an increase in TSS and salt content in all treatments. It could be due to the penetration of sugar and salt into pickle due to osmosis and increased inversion of sugar in the presence of acid during storage. These findings are similar to the reports for carrot pickle given by Chawla et al (2005). A slight decrease in acidity of pickle after 90 days of storage could be due to the utilization of acid in inversion of sugars. This is in accordance with the findings of Muzzaffar (2006) for pumpkin pickle. However slight increase in acidity in treatment T_0 (control) might have occurred due to the production of organic acids during fermentation. Maximum scores for overall acceptability were recorded in T_1 followed by T_2 at 0 as well as after 90 days of storage. Treatment T_0 showed least acceptability by judges after storage. It might be due to microbial spoilage of peach in absence of preservatives like acids, salts etc.

CONCLUSION

It is concluded from the results that peach pickle with treatment T_1 (60°B syrup strength and 5.50% salt) is best followed by treatment T_2 (55°B syrup strength and

6.50% salt) at 0 day as well after 90 days of storage. Pickles with other treatments were found with loose texture and were least acceptable wrt sensory attributes. Therefore peach (cv July Elberta) can be successfully utilised for the preparation and storage of quality sweet peach pickle.

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