

Preparation and storage stability of ber preserve at home scale

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This investigation was carried out to study the acceptability of ber preserved, shelf life, storage stability at household level. Slow method for preparation of ber preserved was found suitable for retention of the quality in terms of colour, taste, texture, flavour and nutritional value upto 360 days of storage period.

Key Words : Nutritional value, Quality, Ber preserved, Storage, Slow and Quick method

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INTRODUCTION

Fruits vegetables and their products have gained considerable importance as they contribute significantly to the human nutrition and economy of many countries in the world. In the present context of development of Indian agricultural economy processing industry has a very significant role to play. Fruit and vegetable processing practiced in India very long time predominantly for making pickles and preserves. Even though fruits and vegetables are considered to be one of the thrust areas in India's export sector in terms of actual export, the performance has been very unsatisfactory. The fruits like ber, pomegranate, bel, aonla, jamun are known for their nutritional, therapeutic and medicinal properties and can be grown in the arid region. The increased awareness about nutrition and health in the society probably is reasonable for increase in consumption of fruits and vegetables and also fruit growers are diverted towards cultivation of dryland wild fruits, which gives comparatively good economic returns.

Ber is often called as poor mans fruit and is one of the richest source of vitamin C, A and B (Chadda *et al.*, 1972). Reports are available that there is no much difference in the nutritive quality of the processed products as against the fresh one (Lal *et al.*, 1996).

The preserved made from such cheaply wildly and

plentiful available fruit we help directly to increase its production by salvaging its spoilage and by increasing its availability during off season. Though some attempts have been made to train the housewives in processing of such common fruits at home scale.

METHODOLOGY

The fresh, healthy and fully matured fruits of six ber cultivars *viz.*, Gola, Kadaka, Mehrun, Sanur, Nagpuri and Umran were selected for preserve making. They were washed dried, pricked and then blanched in boiling water for two minutes. The ber preserve of three varieties were prepared by emphasizing slow and quick method.

Slow method :

30° brix cane sugar syrup was prepared with 0.1 % citric acid. Selected fruits were boiled for 10-15 minutes and left in syrup for 24 hours. Next day ber were drained and brix of the syrup was raised to 40° brix by adding more cane sugar. Then again ber were boiled in it for 5 minutes and left for 24 hours. Process was repeated till the brix reaches upto 60°. After that the strength of syrup was increased by 5° brix at every time sugar was added and then fruits were boiled in the syrup at every alternate day and the mass was left for 48 hours till the final concentration of syrup reached to 70° brix. Fruits were boiled in the syrup for 5 minutes and then stored in sterlised air tight glass containers.

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Quick method :

In quick method blanched ber fruits were boiled continuously in 30° brix sugar till the final concentration of sugar syrup reaches upto 70° brix and then stored in sterilized air tight glass containers. The quantity of sugar to be added every day was determined by adopting person formula in quick method. Ber preserve were stored in cool and dry place to study shelf life. Chemical analysis was done at an interval of 90 days up to 360 days *i.e.* at 0 days, 90, 180, 270 and 360 days and sensory evaluation was carried out at an interval of 120 days of storage. The Factorised Randomized Block Design (FRBD) was employed for statistical evaluation.

OBSERVATIONS AND ASSESSMENT

The statistically analysed data on the sensory score evaluation for all the four quality attributes *i.e.* colour, taste, flavour and texture (Table 1) indicated significant influences of all varieties as well as of storage duration. The interaction effects were found non-significant except for texture in slow method. The mean score of six judges for all the four quality attributes of ber preserved by slow method had more acceptability than that prepared by quick method (Table 1). The sensory evaluation at different interval of storage period showed the trend that mean score for almost all the varieties and attributes decreased with the increase in storage period.

Colour :

Among ber varieties Gola recorded significantly highest

score and was followed by Mehrun for product colour with quick method. All the cultivators were found statistically acceptable for the retention of colour in slow method of ber preserve. Colour at 0 days storage was found superior as compared to other storage period as it slowly faded till 240 days of storage. Ber preserved prepared by quick method showed acceptable retention of the colour upto 120 days of storage period and thereafter, it was found almost not acceptable.

Taste :

The changes in varietal order was observed in the ber preserve prepared by quick method from Gola and Mehrun varieties recorded good score and found statistically acceptable for the retention of taste and was followed by Umran. However, in slow method Gola, Umran, Samaur and Kadaka recorded the highest score and found statistically superior for the retention of the taste than Mehrun and Nagpuri. Slow decreasing trend in taste was observed during storage and it retained acceptable in taste upto 240 days in quick method but ber preserved prepared by slow method was observed in acceptable condition even after 240 days of storage.

Flavour :

In the ber preserve prepared by quick method, Gola cultivar recorded highest score for product flavour followed by Umran and Mehrun. Rest of the varieties were at par for flavour retentions. In slow method Gola and Sanaur recorded highest score followed by Umran, Kadaka and Mehrun but these were

Table 1. Variety and duration wise mean values of sensory evaluation in ber preserve

	Colour		Taste		Flavour		Texture		Totality	
	Quick	Slow	Quick	Slow	Quick	Slow	Quick	Slow	Quick	Slow
Varieties										
Gola	6.2500	6.1041	6.0833	6.4583	5.4166	5.666	5.6875	6.0446	23.7370	24.2700
Kadaka	4.5000	5.7083	4.5000	6.0416	4.0833	5.0416	3.8750	5.1250	16.9580	21.9160
Mehrun	5.1250	5.9166	5.3333	5.4166	4.5833	4.9583	4.5416	5.3750	19.5830	21.6660
Nagpuri	4.3333	5.7500	4.5833	5.1666	4.1250	4.4583	3.9166	4.9583	16.9580	20.3330
Sanaur	4.5000	6.3125	4.8750	6.0625	4.2916	5.3750	4.2083	5.9791	17.8750	23.7290
Umran	4.5416	6.0208	5.1666	6.1250	4.6666	5.1250	4.1250	5.8333	18.5000	23.1040
S.E.±	0.3871	0.3691	0.3849	0.3500	0.4289	0.4052	0.4289	0.4013	1.3856	1.2220
C.D. (P=0.05)	0.7587	--	0.7545	0.6860	0.8406	--	0.8407	0.7865	2.7159	2.3951
Duration (days)										
0	5.888	7.2777	6.3888	7.2361	5.6944	6.1111	5.4305	6.7361	23.4020	27.3610
120	5.6666	6.9583	5.7500	7.0277	5.0833	5.4167	5.222	6.2500	21.7220	25.6520
240	3.9722	4.8055	4.2500	4.7222	3.7222	4.7500	3.4166	4.8611	15.3610	19.1380
360	3.9722	4.8033	3.9722	4.5277	3.6111	4.1388	3.5000	4.3611	15.0550	17.8610
S.E.±	0.6195	0.5906	0.6161	0.5601	0.6863	0.6486	0.6864	0.6422	2.2175	1.9556
C.D. (P=0.05)	1.2143	1.1577	1.2076	1.0979	1.3453	1.2712	1.3454	1.2587	4.3463	3.8329
Interaction (VxD)										
S.E.±	--	--	--	--	--	--	--	0.8026	--	--
C.D. (P=0.05)	--	--	--	--	--	--	--	1.5731	--	--

at par with each other. In both the methods fresh product was observed superior in retention of flavour but it was found in acceptable condition upto 120 days in quick method during storage. However, they were observed in acceptable condition upto 360 days of storage in slow method.

Texture :

The ber cultivars Gola followed by Mehrun, Sanaur and Umran were found superior in texture of ber preserve prepared by quick method. While in slow method varietal order was observed Gola followed by Sanaur, Umran, Mehrun and Kadaka. Performance of Nagpuri cultivar was observed poor in both the methods. The score of sensory evaluation was observed decreasing with increase in storage period in both the methods. The acceptability of ber preserve was observed decreasing with increase in storage period. The retention of texture was observed acceptable upto 120 days in quick method. However, the retention of texture was observed acceptable upto 360 days in slow method for preparation for ber preserve.

Overall, only Gola cultivar recorded statistically superior score for quality attributes of ber preserve in quick method. However, in slow method Gola followed by Sanaur and Umran recorded statistically better score. The storage of the product in both the methods was found highly acceptable upto 120 days, however, in slow method it was acceptable upto 360 days.

Chemical analysis :

Data pertaining to the chemical analysis of ber preserve (Table 2) indicated that varieties, duration as well as their interactions influenced significantly the chemical content like, acidity, ascorbic acid, reducing and non reducing sugar in ber preserve prepared by both the methods except reducing sugar in quick method.

The mean acidity per cent for all the cultivars was found ranging between 0.298 to 0.44 in quick method and 0.272 to 0.394 in slow method. The data pertaining to the changes in acidity revealed that there was increase in titratable acidity with increase in storage period. The acidity level attended by the product between 270 to 360 days of storage was very high but it was comparatively low in slow method.

In both the methods of ber preserve preparation, higher ascorbic acid contents was found in Mehrun followed by Umran, Sanur, Kadaka and Gola. However, the more retention of ascorbic acid was observed in slow method. The ascorbic acid and other content appeared to be decreased throughout the storage period. The ascorbic acid content was found decreased from 17.28 mg/100g (0-days) to 7.94 mg/100 g (360-days) in quick method, however, in slow method it was found decreased from 18.535 mg/100g (0-days) to 9.088 mg/100 g (360 days).

In reducing sugar content did not observe any marked differences in ber preserve prepared by both the methods. Reducing sugar was found linearly increased with increase in storage period upto 360 days. However, reverse trend was

Table 2. Variety and duration wise mean values of chemical attributes with statistical parameters for ber preserve

	Total acidity interms of citric acid (%)		Ascorbic acid (mg/100g)		Reducing sugar (%)		Non reducing (%) sugar		Total sugar (%)	
	Quick	Slow	Quick	Slow	Quick	Slow	Quick	Slow	Quick	Slow
Varieties										
Gola	0.344	0.340	11.048	11.924	47.037	47.147	24.019	24.997	71.560	72.580
Kadaka	0.356	0.348	12.750	13.670	46.904	47.140	24.261	24.527	71.165	71.900
Mehrun	0.298	0.272	14.838	16.132	47.329	47.227	24.487	26.082	71.815	73.200
Nagpuri	0.440	0.394	9.797	11.376	46.278	46.901	24.180	24.289	70.458	71.70
Sanaur	0.324	0.310	13.360	14.970	47.108	47.167	24.447	25.710	71.655	73.180
Umran	0.312	0.392	13.868	15.144	47.501	47.553	24.593	26.563	72.294	74.000
S.E. _±	0.0030	0.0032	0.0290	0.0030	0.5168	0.039	0.0459	0.0478	0.0033	0.0133
C.D. (P= 0.05)	0.0059	0.0063	0.0568	0.0059	--	0.0765	0.0899	0.0937	0.0065	0.0261
Duration (days)										
0	0.230	0.207	17.280	18.535	34.632	34.951	36.645	34.467	71.277	71.691
90	0.270	0.277	15.075	16.648	40.126	40.696	30.104	32.464	71.392	72.362
180	0.323	0.330	12.595	13.748	46.987	47.272	24.803	25.457	71.466	72.591
270	0.400	0.382	10.078	11.327	53.188	54.994	17.204	17.697	71.466	72.614
360	0.490	0.427	7.940	9.088	58.877	59.050	12.033	13.564	71.521	72.729
S.E. _±	0.0054	0.0058	0.0518	0.0054	0.9247	0.0698	0.0821	0.0855	0.0059	0.0238
C.D. (P= 0.05)	0.0106	0.113	0.1016	0.0106	1.8124	0.1369	0.1609	0.1676	0.0116	0.0467
Interaction										
S.E. _±	0.0067	0.0072	0.0648	0.0067	1.1557	0.0873	0.1026	0.01069	0.0074	0.0298
C.D. (P= 0.05)	0.0132	0.0141	0.1270	0.0132	--	0.1711	0.2011	0.2095	0.0145	0.0583

observed in case of the non-reducing sugar content during storage. It was found linearly decreasing at very fast rate with the increase in storage period upto 360 days. Similarly the total sugar content in ber preserve was also observed linearly increased with increase in storage period upto 360 days. Slow method for preparation of ber preserved observed more effective than quick method.

Conclusion:

The ber preserve prepared by slow method was found better in respect of retention of the quality attributes like colour, taste, texture and flavour up to the 360 days of storage as compared to the quick method.

From nutritional point of view the ber preserve prepared

by slow method from cultivar Mehrun possessed better qualities and was followed by Umran, Sanur, Gola and Kadaka as compared to Nagpuri.

The cultivars Gola, Umran, Mehrun and Sanur were observed better for ber preserve preparation.

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