

Investigation on acceptability and chemical attributes of mixed fruit jam

REKHA A. LANDE

Investigation on mixed fruit jam was undertaken with respect to standardization of the process by pulp method for Sanuar and Umran ber cultivars with mixing papaya pulp. Considering Sensory score for overall acceptability of mixed fruit jam prepared with the proportion of 60 per cent ber + 40 per cent papaya and 70 per cent ber + 30 per cent papaya. The sensory values of the quality attributes observed to be decreased slowly upto 180days at room and freeze temperature. The mixed fruit jam stored at freeze temperature found better in quality attributes. Chemical evaluation of mixed fruit jam indicated the gradual increase in total acidity, reducing and total sugar content and decrease in ascorbic acid and non reducing sugar with increase in storage period from 0 to 180 days. The mixed fruit jam prepared by using the proportion of 60 per cent ber + 40 per cent papaya resulted into better quality with the high consumer index and overall acceptability. Similarly the changes in chemical attributes during the storage period upto 180 days were observed negligible at freeze temperature in comparison to room temperature.

Key Words : Acceptability, Sensory score, Chemical attributes, Mix fruit jam

How to cite this article : Lande, Rekha A. (2013). Investigation on acceptability and chemical attributes of mixed fruit jam. *Food Sci. Res. J.*, 4(1): 84-88.

INTRODUCTION

India with its diverse, but favourable agro-climatic conditions produces a wide range of tropical and temperate fruits. These fruits being perishable commodity, they have to be consumed fresh. There is considerable wastage of fruits as only 0.5 per cent fruits are being processed. Ber and papaya are indigenous fruits grown practically all over the country. Both fruits are cheap, widely and plentiful available in same season and are rich source of vitamin A, B and C. Papaya is the commercial source of enzyme *papin* and *pectin* which is essential in preparation of jam.

Now-a-days the increased awareness about nutrition and health in society probably increased the consumption of fruits and vegetables. The processing industry is yet to be exploited for these fruits and, therefore, the present investigations were taken up to develop and evaluate mix fruit jam in terms of equality and chemical attributes.

METHODOLOGY

Mixed fruit jam (ber + papaya) was prepared by pulping method. Two varieties of ber cultivars Sanuar and Umran were selected for making mixed fruit jam. Large sized, healthy ber fruits which reached to maturity and seedless matured papaya fruits were used in different proportions of 70 per cent ber pulp + 30 per cent papaya pulp and 60 per cent ber pulp + 40 per cent papaya pulp for the preparation of mixed fruit jam and compared with the 100 per cent ber jam (control).

Storage stability study of mixed fruit jam was undertaken from 0 to 180 days. The quality attributes like colour, taste, flavor and texture were evaluated by undertaking sensory evaluation. From the score of the sensory evaluation the overall acceptability and consumer index were studied. During the course of storage period at an interval of 60 days, the chemical attributes in terms changes in total acidity ascorbic acid (mg/100g), reducing and non reducing sugar were analyzed at room and freeze temperature.

OBSERVATIONS AND ASSESSMENT

In the present investigation the mixed jam of ber and seedless papaya prepared by pulp method in different

AUTHOR FOR CORRESPONDENCE

REKHA A. LANDE, Department of Home Science, Shri. Shivaji Science, Arts and Commerce College, AKOLA (M.S.) INDIA

Email: smtaley@rediffmail.com

Table 1. Variety and duration wise mean score of sensory evaluation for mixed fruit jam

Varieties	Composition	Storage period	Storage temperature									
			Colour		Taste		Flavour		Texture		Overall acceptability	
			Room	Freeze	Room	Freeze	Room	Freeze	Room	Freeze	Room	Freeze
Sanuar	100% Ber	0	7.40	--	7.60	--	7.80	--	7.00	--	7.45	--
		60	7.00	7.40	7.20	8.00	7.50	8.20	6.80	7.30	7.20	7.72
		120	6.70	7.20	7.00	7.70	7.20	7.70	6.70	7.20	6.90	7.04
		180	6.50	7.10	6.20	7.20	6.20	7.10	6.20	6.70	6.27	7.02
	70% Ber + 30% papaya	0	7.20	-	8.00	-	7.40	-	7.40	-	7.50	-
		60	7.20	7.80	7.50	8.00	7.20	7.77	0.20	7.80	7.27	7.84
		120	6.80	7.70	7.20	7.70	7.00	7.50	6.80	7.50	6.95	7.60
		180	6.50	7.50	6.80	7.20	6.50	7.00	6.50	7.20	6.57	7.17
	60% Bber + 40% papaya	0	8.80	-	9.90	-	8.00	-	7.70	-	7.70	-
		60	7.80	8.20	7.80	8.50	7.80	8.30	7.40	7.80	7.70	8.20
		120	7.50	7.80	7.50	8.20	7.10	7.90	6.70	7.70	7.20	7.90
		180	6.80	7.20	7.00	7.70	6.50	7.70	6.30	7.20	6.65	7.45
Umran	100% ber	0	7.20	-	7.80	-	7.70	-	7.50	-	7.55	-
		60	7.00	7.70	7.50	8.10	7.50	7.80	7.20	7.90	7.30	7.87
		120	6.80	7.20	7.00	7.80	7.20	7.50	7.00	7.50	7.00	7.50
		180	6.50	7.00	6.50	7.50	6.40	7.40	6.40	7.70	6.45	7.40
	70% Ber + 30% papaya	0	7.60	--	7.80	--	7.70	--	7.50	--	7.55	--
		60	7.00	7.70	7.50	8.10	7.50	7.80	7.20	7.90	7.30	7.87
		120	6.70	7.20	7.00	7.80	7.20	7.50	7.00	7.50	7.00	7.50
		180	6.50	7.00	6.20	7.50	6.40	7.20	6.50	7.10	6.40	7.20
	60% Ber + 40% papaya	0	8.60	--	8.60	--	8.20	--	8.80	--	8.55	--
		60	7.20	7.90	8.50	8.90	7.70	8.20	7.20	8.00	7.65	8.25
		120	6.70	7.70	7.70	8.50	7.40	7.80	7.00	7.60	7.20	7.90
		180	6.50	7.50	7.00	8.20	6.50	7.50	6.50	7.10	6.67	7.52

proportions of 70 per cent ber + 30 per cent papaya and 60 per cent ber + 40 per cent papaya and compared with the 100 per cent ber at room and freeze temperature from 0 to 180 days of storage. The mixed fruit jam stored at freeze temperature rating in sensory evaluation of quality attributes like colour, taste, texture, flavor as well as overall acceptability with high consumer index (Table 1 and 2). Likewise the chemical changes in chemical attributes like total acidity, ascorbic acid, reducing and non reducing sugar (Table 3) were also found negligible upto the storage of 180 days.

Sensory evaluation:

During storage period of 0 to 180 days, the score of sensory evaluation (Amerine *et al.*, 1965) conducted at 60 days interval indicated the higher level of retention in quality attributes in mixed fruit jam prepared with 60 per cent ber + 40 per cent papaya with consumer index of 0.82 (0 days) to 0.74 (180 days) followed by 70 per cent ber + 30 per cent papaya with the consumer index of 0.78 (0 days) to 0.71 (at

180 days) over the mixed fruit jam stored at room temperature. The overall acceptability was observed reduced for the mixed fruit jam stored at room temperature as compared to stored at freeze temperature. Overall reduction in score of the quality attributes was observed with increase in the storage period from 0 to 180 days.

Chemical evaluation:

Trend of changes in chemical attributes indicated the linear increase in total acidity, reducing sugar, total sugar and linear decrease in ascorbic acid and non reducing sugar content over the increase in storage period of mixed fruit jam and the jam prepared from the ber alone.

The mixed fruit jam prepared from both the varieties of ber (Sanuar and Umran) and seedless papaya in the 60 per cent ber + 40 per cent papaya the total acidity, reducing sugar and total sugar percentage were found increased from 0.26 per cent to 0.46 per cent, from 38.40 per cent to 40.50 per cent and 71 per cent to 71.80 per cent, respectively (Table 3, 4 and 5).

Table 2. Attribute wise total of the score of six judges and consumer index for mixed fruit ber jam prepared by pulping method

Composition	Storage period	Colour (60)		Taste (60)		Flavour (60)		Texture (60)		Total source (210)		Consumer index (total score)/240	
		Storage temperature											
		Room	Freeze	Room	Freeze	Room	Freeze	Room	Freeze	Room	Freeze	Room	Freeze
Cultivar : Sanur													
100 % Ber	0	44.4	0.0	45.6	-	46.8	-	42.0	-	178.8	-	0.75	-
	60	42.0	44.4	43.2	48.0	45.0	49.2	40.8	43.8	171.0	185.4	0.71	0.77
	120	40.2	43.2	42.0	46.2	43.2	46.2	40.2	43.2	165.6	178.8	0.69	0.75
	180	39.0	42.6	37.2	43.2	37.2	42.0	37.2	40.2	150.6	168.0	0.63	0.70
70% Ber + 30% papaya	0	43.2	-	48.0	-	44.4	-	44.4	-	180.0	-	0.75	-
	60	43.2	46.8	45.0	48.0	43.2	46.2	43.2	46.8	174.6	184.3	0.78	0.78
	120	40.8	46.2	43.2	46.2	42.0	45.0	40.8	45	166.8	182.2	0.76	0.76
	180	39.0	45.0	40.3	43.2	39.0	42.0	39.0	43.2	157.8	177.6	0.66	0.74
60% Ber + 40 % papaya	0	52.8	-	54.0	-	48.0	-	46.2	-	201.0	-	0.84	-
	60	46.8	49.2	46.8	51.0	46.8	49.8	44.4	46.6	184.8	196.8	0.77	0.82
	120	45.0	46.8	45.0	49.2	42.6	42.2	40.2	46.2	172.8	184.4	0.72	0.77
	180	40.8	43.2	42.0	46.2	39.0	46.2	37.8	43.2	159.6	178.8	0.67	0.74
Cultivar : Umran 100% Ber	0	43.2	-	46.8	-	46.2	-	45.0	-	181.2	-	0.76	-
	60	42.0	46.2	45.0	48.6	45.0	46.8	43.2	47.4	177.2	189.0	0.73	0.79
	120	40.8	43.2	42.0	46.8	43.2	45.0	42.0	45.0	168.0	180.0	0.70	0.75
	180	39.0	42.0	37.2	45.0	38.4	43.2	39.0	47.6	153.6	172.8	0.64	0.72
70% Ber + 30% papaya	0	45.6	-	46.8	-	46.8	-	45.6	-	184.8	-	0.77	-
	60	42.0	51.0	45.0	49.2	45.0	51.0	44.4	48.0	176.4	199.2	0.74	0.83
	120	40.2	45.0	43.2	47.4	42.6	49.2	43.2	47.4	159.2	189.0	0.71	0.79
	180	39.0	42.0	39.0	45.0	38.4	44.4	38.4	46.2	154.8	177.6	0.65	0.71
60% Ber + 40% papaya	0	51.6	-	51.6	-	49.2	-	52.8	-	205.2	-	0.86	-
	60	43.2	47.4	51.0	53.4	46.2	49.2	43.2	48.0	183.6	198.0	0.77	0.83
	120	40.2	46.2	46.2	51.0	44.4	46.8	42.0	45.6	172.0	189.6	0.72	0.79
	180	39.0	45.0	43.2	48.0	39.0	45.0	39.0	42.6	160.2	180.6	0.67	0.75

Table 3. Effect of room and freeze temperature on total acidity (%) of mixed fruit jam during storage

Varieties	Storage period, days	Room temperature			Freeze temperature		
		100% Ber	70% Ber + 30% papaya	60% Ber + 40% papaya	100% Ber	70% Ber + 30% papaya	60% Ber + 40% papaya
Sanuar	0	0.16	0.22	0.24	-	--	--
	60	0.20	0.26	0.30	0.14	0.18	0.26
	120	0.28	0.30	0.38	0.20	0.24	0.32
	180	0.34	0.36	0.48	0.32	0.32	0.40
Umran	0	0.22	0.24	0.38	--	-	--
	60	0.24	0.28	0.40	0.20	0.22	0.36
	120	0.32	0.34	0.48	0.28	0.26	0.42
	180	0.42	0.44	0.50	0.36	0.40	0.46

Table 4. Effect of room and freeze temperature on reducing sugar (%), of mixed fruit jam during storage

Varieties	Storage period, days	Room temperature			Freeze temperature		
		100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya	100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya
Sanuar	0	34.70	36.40	38.00	--	--	--
	60	36.60	37.90	39.80	35.20	36.90	38.90
	120	39.10	39.60	41.20	36.10	37.80	40.00
	180	42.00	42.40	43.10	36.90	38.20	40.40
Umran	0	34.40	36.00	37.90	--	--	--
	60	36.00	38.00	40.20	35.10	36.80	38.40
	120	38.90	40.70	42.40	36.20	38.10	39.20
	180	41.90	42.40	43.40	37.00	38.90	40.50

Table 5. Effect of room and freeze temperature on total sugar (%), of mixed fruit jam during storage

Varieties	Storage period, days	Room temperature			Freeze temperature		
		100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya	100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya
Sanuar	0	71.10	71.40	71.20	--	--	--
	60	71.60	71.80	71.60	71.20	71.40	71.40
	120	71.60	71.90	71.80	71.30	71.40	71.60
	180	72.00	72.00	72.10	71.30	71.50	71.80
Umran	0	71.10	71.30	70.80	--	--	--
	60	71.70	71.80	71.20	71.20	71.50	71.00
	120	71.80	72.00	71.50	71.40	71.50	71.20
	180	72.00	72.20	71.80	71.60	71.50	71.40

Table 6. Effect of room and freeze temperature on ascorbic acid (mg/100g), of mixed fruit jam during storage

Varieties	Storage period, days	Room temperature			Freeze temperature		
		100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya	100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya
Sanuar	0	8.00	7.11	6.3	--	--	--
	60	5.25	4.97	3.59	6.47	5.30	4.01
	120	3.89	3.05	2.89	4.20	3.62	3.19
	180	2.47	2.01	1.88	3.15	2.89	2.2
Umran	0	8.79	7.58	6.87	--	--	--
	60	5.75	4.82	3.67	6.89	5.67	4.38
	120	4.01	3.52	2.96	4.36	4.00	3.75
	180	2.75	2.05	1.90	3.36	2.99	2.46

Table 7. Effect of room and freeze temperature on non-reducing sugar (%), of mixed fruit jam during storage

Varieties	Storage period, days	Room temperature			Freeze temperature		
		100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya	100% ber	70% ber + 30% Papaya	60% ber + 40% Papaya
Sanuar	0	36.40	35.00	33.20	--	--	--
	60	35.00	33.90	31.80	36.00	34.50	32.50
	120	32.50	32.40	30.60	35.20	33.60	31.60
	180	30.00	29.40	29.00	34.40	33.30	31.40
Umran	0	36.70	35.30	32.90	--	--	--
	60	35.70	33.80	33.00	36.10	34.70	32.60
	120	32.90	31.30	29.10	35.20	33.40	32.00
	180	30.10	29.80	28.40	34.60	32.60	30.90

Similarly the ascorbic acid content and reducing sugar percentage was found decreased from 4.38 to 2.2 mg/100g of mixed fruit jam and 32.50 to 30.90 per cent, respectively at freeze temperature during the storage period of 0 to 180 days (Table 6 and 7). There was not much more change was observed in the mixed fruit jam having the proportion of 70 per cent ber + 30 per cent papaya. However, the significant change in the chemical attributes of both mixed fruit jam was observed at room temperature.

Conclusion:

The mixed fruit jam with the proportion of 60 per cent

ber + 40 per cent papaya was found better than other proportions of mixed fruit jam stored at freeze temperature upto 180 days.

LITERATURE CITED

- Amerine, M.A., Pangborn, R.M. and Edward, B.R.** (1965). *Principles of sensory evaluation of food*. Academic Press New York and London. pp. 459-489.
- Khurdia, D.S. and Roy, S.K.** (1986). Solar drying of fruits and vegetables. *J. Indian Food Packer*, 18-31.
- Lal, G. Siddapa, G.S. and Tandon, G.L.** (1986). *Preservation of fruits and vegetables*, revised Ed. Pub. by ICAR : 198-199.

Received : 09.02.2013; Revised: 04.03.2013; Accepted : 01.04.2013