

Research Note

Preparation and evaluation of guava-carrot jelly

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Abstract

Experiments were conducted to develop the fruit jelly using various level of guava extract and carrot juice content Viz. ,75:25, 50:50 and 25:75. The prepared fruit jelly filled in jars was labeled and stored at room temperature upto 90 days to determine the physico-chemical and sensory quality attributes. Evaluation for fresh as well as stored samples was done at an interval of 15, 30, 45, 60, 75 and 90 days of storage at room temperature (37°C). The maximum overall acceptability score for the fresh product prepared with the amount of guava extract and carrot juice level of 75:25 was awarded as 7.8 (like moderately). It was concluded that fruit jelly prepared with guava extract and carrot juice ratio of 75:25 was found to be superior to those prepared with other ratios. In general ,there was decrease in most of physico-chemical and sensory qualities during the storage.

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Introduction

Jelly is a semi-solid product prepared by boiling a clear strained fruit extracts free from pulp after the addition of required amount of sugar, citric acid and pectin. It should contain minimum 65 percent of total soluble solids and minimum 45 percent of fruit portion (Dhawan, 1998). Guava is a rich source of pectin and acid content and have thick flesh and is preferred for jelly making. Guava (*Psidium guajava* L.) is native of tropical America and belongs to family Myrtaceae. It is the apple of the tropics and is one of the most common fruits of India. It is the 5th important fruit crop in India with a production of 1.85 million tonnes from an area of 1.60 lakh hectare (Anon, 2009). It is mainly produced in the state of Bihar, Uttar Pradesh, Karnataka, Madhya Pradesh, Gujarat, Andhra Pradesh, Maharashtra, Punjab, Haryana and Tamil Nadu. It excels to most of the other fruits in productivity, hardiness, wide adaptability and vitamin C content. It is a rich source of ascorbic acid, pectin and contains considerable amounts of calcium, potassium .

Carrot juice produced from carrots, is often consumed as a health drink. It has particularly high content of β -carotene, a

source of vitamin A, but it is also high in B complex vitamins and many minerals including calcium, copper, magnesium, potassium, phosphorus, and iron. Carrot juice has a uniquely sweet flavour of carrots. Unlike many juices it is opaque. It is high in beta-carotene.

Carrots have also been made into soups and juices for hundreds of years. In America carrot juice was one of the first colorants used to make cheese a darker color. Food Jelly is a product of considerable acceptance amongst the consumers. A Combination of carrot jelly was developed and its quality evaluation is reported in this communication.

Materials and Methods

Fresh and fully ripened, mature, uniform size guava and red carrot were procured from the local market of Meerut. Guava and Carrot free from disease and insects infection were selected for the investigation. Other raw materials including sugar, glass jar, chemicals and preservatives were also procured from the local market for the present study. The guava and carrot mixed fruit jelly were prepared according to the standardized

procedure as described by Srivastava and Kumar (2010) The jelly was prepared from the extracted guava and carrot juice by power operated juice extractor, adjusting its soluble solid and acidity as per FPO specifications for jelly by mixing the juice with required quantity of sugar syrup prepared from sugar and added the citric acid and pectin during boiling. The prepared jelly was filled into jar leaving a head space of 2.5 to 3.0 cm and capping was done. Labeled jars were stored at room temperature. Sample containing three of fruit extract proportion viz. 75:25, 50:50, 25:75 of guava and carrot, were prepared and evaluation by sensory panel. The samples were prepared and storage studies were conducted. The jars were labeled and stored at room temperature up to 90 days to determine the physico-chemical and sensory quality attributes of mixed fruit jelly. Total soluble solids (TSS) were determined using hand refractometer. The colour was measured in terms of optical density. The moisture content and acidity was estimated as per the method described by Ranganna (2001). The estimation of ascorbic acid content using 2, 6- Dichlorophenol indophenol dye was titrimetrically as per the modified procedure of AOAC (1984). Sensory evaluation for various attributes was done on the hedonic scale using prescribed performed by sensory panel (Joshi, 2006)

Results and Discussions

Physico-chemical Characteristics

The effect of juice composition and storage period on TSS, pH, moisture content, optical density (OD) and ascorbic acid were determined. The different combinations of guava extract and carrot juice ratio with respect to change in moisture content (%) during storage are given in Table.1. It is clear that the moisture content (%) of samples decreased with increase in storage periods at room temperature. It is also explicit from the results that the effect of compositions (guava extract and carrot juice) were found significant. The combined effect of composition and storage period were also significant. The study also revealed that moisture content (%) decreased with increase in storage period at ambient storage. Similar trends were reported by Aggarwal (1997) for grape and guava blends jelly during storage (Ranganna, 2001).

It is clear that the TSS (°Brix) of samples increased with increase in storage periods at room temperature (Table 1). It is explicit that the effect of compositions (guava extract and carrot juice) and storage period was found significant. The combined effect of composition and storage period were also significant. The study also revealed that TSS increased with increase in storage period irrespective of storage conditions. The significant increase ($P < 0.05$) in TSS could be due to the degradation of polysaccharides during storage into soluble compounds

(Mehta & Bajaj, 1969; Singh *et al.*, 2004; Selvamuthukumar *et al.*, 2007).

The results showed that the pH of samples increased with increase in storage periods at room temperature. The pH also increased with storage period irrespective of guava extract to carrot juice ratio. The effect of compositions (guava extract and carrot juice) and storage period were found significant. The combined effect of composition and storage period were also significant. The study also revealed that pH increased with increase in storage period at ambient storage conditions (Table 1). Similar trends were reported by Aggarwal *et al.*, (1997) in case of jelly preparation from grape and guava blends.

It is clear that the optical density of samples increased with increase in storage periods at room temperature. (Table 1). The effect of compositions (guava extract and carrot juice) and storage period were found significant. The combined effect of composition and storage period were also significant. The increase in optical density indicated browning with advancement of storage periods, which could be ascribed to oxidation and development of non-enzymatic browning (an amino acid and reducing sugar reaction). Similar trends were also reported by Masoodi *et al.*, (2005) and Selvamuthukumar *et al.*, (2007).

The bar chart for different combinations of guava extract and carrot juice ratio with respect to change in ascorbic acid during storage. It is clear that the ascorbic acid of samples decreased with increase in storage periods at room temperature. It is also explicit that the effect of compositions (guava extract and carrot juice) and storage period were found significant. The combined effect of composition and storage period were also significant. The study also revealed that ascorbic acid decreased with increase in storage period. The decreased in ascorbic acid content in mixed fruit jelly could be attributed to oxidation of ascorbic acid into dehydroascorbic acid by trapped oxygen in the glass jar (Selvamuthukumar *et al.*, 2007).

Sensory Evaluation

Sensory quality of jelly attributes viz. color, texture, flavor, mouthfeel and overall acceptability were evaluated. Nine points Hedonic rating test method as recommended by Joshi, (2006) was used for the purpose of sensory evaluation. This test measures the consumer's acceptability.

The sensory score of colour for jelly ranged 5.7-7.6, 5.50-7.60 and 5.60-7.90 for G:C jelly in the ratio of 75:25, 50:50 and 25:75, respectively. Highest colour was observed for 25:75 (G:C) jelly followed by 75:25 and 50:50 ratio. The score of colour decreased with increase the storage period at ambient temperature. Most

Table 1: Change in Physico-chemical attributes of mixed fruit jelly during storage

Storage (days)	Moisture			TSS			pH			OD			Vitamin C		
	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75
0	23.63	24.02	23.73	68.10	68.30	68.20	3.59	3.61	3.59	0.064	0.06	0.062	6.361	6.357	6.354
15	23.02	23.61	23.08	70.30	70.10	70.00	3.68	3.74	3.68	0.125	0.122	0.124	6.233	6.247	6.121
30	22.00	23.03	22.84	71.20	71.10	71.10	3.75	3.71	3.75	0.214	0.216	0.217	5.554	5.551	5.548
45	20.02	22.06	22.15	71.90	71.90	72.10	3.81	3.81	3.80	0.292	0.291	0.293	4.720	4.935	4.734
60	19.58	20.07	19.73	72.90	73.20	73.10	3.83	3.84	3.90	0.317	0.323	0.324	3.889	3.881	3.807
75	22.59	22.62	22.60	75.10	75.10	75.20	3.90	3.92	3.89	0.390	0.392	0.387	2.929	2.906	2.901
90	19.83	21.58	19.88	77.20	77.20	77.10	3.91	4.13	4.01	0.462	0.458	0.463	2.093	2.075	2.035
CD _{5%}	0.537			0.537			0.077			0.033			0.097		

Table 2: Change in sensory attributes of mixed fruit jelly during storage

Storage (days)	Colour			Flavour			Texture			Mouthfeel			Overall Acceptability		
	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75	75:25	50:50	25:75
0	7.6	7.60	8.10	7.90	7.70	7.40	8.00	7.80	7.70	7.80	7.70	7.50	7.80	7.70	7.60
15	7.4	7.30	7.60	7.70	7.50	7.30	7.80	7.60	7.50	7.60	7.40	7.10	7.60	7.40	7.30
30	6.7	6.90	7.20	7.20	7.00	7.00	7.50	7.20	7.00	7.20	7.00	7.00	7.10	7.00	7.00
45	6.6	6.70	6.90	7.00	6.80	6.50	6.90	6.80	6.60	6.80	6.50	6.80	6.80	6.70	6.80
60	6.2	6.30	6.60	6.70	6.30	6.00	6.60	6.50	6.20	6.40	6.20	6.60	6.40	6.30	6.30
75	6.0	6.30	6.10	6.00	5.50	5.40	6.20	6.10	6.00	6.10	5.90	5.70	6.00	5.80	5.80
90	5.7	5.50	5.60	5.60	5.20	5.00	5.80	5.60	5.50	5.50	5.30	5.10	5.60	5.40	5.30
CD _{5%}	0.529			0.436			0.425			0.407			0.245		

G= guava juice C = carrot juice

of the samples were unacceptable by the panelist after storage of 90 days. It is explicit that the effect of composition of guava extract to carrot juice ratio and storage periods on colour score was significant. Similar trends were also reported by Selvamuthukumaran *et al.*, (2007) and Masoodi *et al.*, (2005).

Flavor score was observed the highest for 75:25 followed 50:50 and lowest 25:75 (G:C) ratio of jelly. Flavor score was decreased with storage period but increased with increasing composition of guava juice in jelly. Most of the samples were not accepted by the panelist after storage of 90 days. The effect of composition of guava extract to carrot juice ratio and storage periods on flavour score were found significant (Table 2).

Texture score for jelly was found the highest for fresh jelly but decreased with increase the storage period during ambient condition. Highest score of texture of jelly after 90 days was not acceptable condition. The texture score was affected by the composition of guava extract in jelly. The texture score of jelly decreased with increase the guava juice ratio irrespective of storage period. The effect of composition of guava extract to carrot juice ratio and storage periods on texture score differ significantly. Similar trends were reported by Masoodi *et al.*, (2005), Selvamuthukumaran *et al.*, (2007).

Mouth feel scores were decreased for all the samples with few exceptions during storage (Table 2). Most of the samples were not accepted by the panelist after storage of 90 days. Effect of composition of guava extract to carrot juice ratio and storage periods on mouth feel score were found significant.

Effect on Overall acceptability

In general significant decrement in overall acceptability score was observed for all the samples with few exceptions during storage (Table 2). Most of the samples were not accepted by the panelist after storage of 90 days. It is explicit that the effect of composition of guava extract to carrot juice ratio and storage periods on overall acceptability score were found significant at $p < 0.05$ level of significance. From present investigation, it was concluded that mixed fruit jelly prepared with guava extract and carrot juice with the ratio of 75:25 were found to be better organoleptically than those ratios and followed by the ratio of 50:50 and 25:75, respectively.

Conclusion

The maximum overall acceptability score for the fresh samples prepared with the ratio of guava extract and carrot juice level 75:25 were awarded as 7.8 (like moderately). However, the minimum overall acceptability score of 5.3 (neither like nor dislike) was obtained to that sample which had guava extract and carrot juice ratio of 25:75 after 90 days of storage at room temperature. The overall acceptability of mixed fruit jelly decreased with storage periods irrespective of storage condition. It was concluded that mixed fruit jelly prepared with guava extract and carrot juice ratio of 75:25 were found to be superior to those prepared with other ratios.

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