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Short communication

Studies on preparation and biochemical changes in guava ready-to-serve beverage during storage

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Guava (*Psidium guajava* L.) is one of the important fruits of India and ranks fourth in area and production after mango, banana and citrus. The fruits are rich in Vitamin-C, pectin, phosphorus and calcium (Wilson, 1980). The chemical composition of fruits differ with variety, stage of maturity, size and season. Guava is available in plenty during the fruiting season. Its disposal becomes a serious problem particularly in rainy season. Its utilization is very little in processing industry. Only jelly is made from its fruits. But its excellent flavour and nutritive value have a great potential in beverage. The beverage are becoming popular in comparison to synthetic or carbonated drinks. Therefore, the present study was undertaken to exploit its potential in the bevarage industry drinks.

The present study was carried out at the Department of Horticulture, College of Agriculture, I.G.A.U., Raipur during 2003-04. The semi-ripe fruits of Lucknow-49 guava were cut into pieces and after separation of seeds, juice was extracted. The juice was kept for 3-4 hours to settle down the coarse particles. The supernatant solution was siphoned-off, leaving the coarse particles. Syrup was prepared by adding sugar and citric acid to the water and dissolved by heating. The filtered syrup was mixed with the filtered juice after cooling and filled immediately in already sterilized bottles leaving 5 cm head space and sealed air tight. The ready-to-serve had 10 per cent pulp, 12 per cent total soluble solids and 0.3 per cent acidity. No synthetic colour and essence were added to the ready-to-serve. The product was stored at ambient condition (30±2°C).

The chemical composition viz., TSS was determined by Hand Refractometer, while total sugar, reducing sugar, acidity and ascorbic acid was estimated by the method as suggested by Ranganna (1997). Non-reducing sugar was determined by subtracting the value of reducing sugar from total sugar. The pH value was taken on digital pH meter. Ready-to-serve beverage were subjected to sensory evaluation by a panel of five judges following the Hedonic rating test as described by Ranganna (1997).

Biochemical composition changes in guava ready-to-serve (RTS) during storage period presented in the Table 1, clearly indicates that the ascorbic acid content in guava ready-to-serve (RTS) beverage decreased continuously during storage periods. Reduction in ascorbic acid might be due to oxidation by trapped oxygen in glass bottle, which might have resulted in the formation of dehydro ascorbic acid. Loss in ascorbic acid content of fruit beverage has also been noticed in papaya (Kumar, 1990), in mango (Rabbani, 1992) and in guava (Pandey and Singh, 1998).

The increase in acidity in ready-to-serve (RTS) during 150 days of storage may be due to formation of organic acids by ascorbic acid degradation as well as progressive decrease in pectin content. Similar findings were also reported in the beverage of papaya (Kumar, 1990), Mango (Rabbani, 1992) and guava (Baramanray *et al*, 1995; Pandey and Singh, 1998; Pandey, 2004).

The pH value in guava's ready-to-serve (RTS) showed a decreasing trend with increasing periods of storage upto 150 days under room temperature. The reduction in pH could be attributed to simultaneous increase in acidity and total soluble solids of ready-to-serve (RTS) at storage temperature. The present findings are in agreement with those of Sethi (1993) and Prasad and Mali (2000) in litchi and pomegranate squash beverage, respectively.

The increase in reducing sugar as well as total sugar corresponded to the increase in total soluble solids (TSS) and ultimate decrease in non-reducing sugar in ready-to-serve beverage during storage period. The variation in different fraction of sugar might be due to hydrolysis of polysaccharides sugar into reducing sugar as increase in reducing sugar was correlated with the decrease in non-reducing sugar. The increased level of total sugar was probably due to conversion of starch and pectin into simple sugars. Similar findings were reported by Murari and Verma (1989) and Baromanray *et al.*, (1995) in guava and by Shrivastava (1998) in mango beverages.

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Table 1. Changes in biochemical composition in guava ready-to-serve (RTS) during storage period at ambient temperature

Storage period (days)	Ascorbic acid (mg/100g)	Acidity (%)	pH	Total soluble solids (%)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)	Organoleptic evaluation (At a scale 36)
0	9.75	0.32	5.74	12.00	11.05	2.58	8.30	26.15
30	9.75	0.32	5.74	12.01	11.05	3.06	8.00	26.09
60	9.25	0.32	5.26	12.03	11.07	3.22	7.87	25.67
90	9.15	0.34	5.15	12.10	11.09	3.59	7.50	25.38
120	9.00	0.42	4.99	12.15	11.10	4.10	7.00	24.84
150	8.38	0.49	4.88	12.20	11.12	4.28	6.85	23.85
S.Em ±	0.03	0.01	0.01	0.01	0.00	0.07	0.01	0.14
C.D. (5%)	0.09	0.03	0.02	0.04	0.01	0.21	0.02	0.43

There was a considerable decrease in ready-to-serve (RTS) in sensory mean score for taste, flavour and taste, flavour and overall acceptability during storage periods. The sensory mean score for each attribute was highest on the day of preparation, which decreased with increasing periods of storage. There are many extrinsic factors which determine the storage stability of products and temperature plays an important role among them. There are certain biochemical changes which occurs under low pH and high temperature that leads to formation of brown pigment and produces off flavour in the beverages.

The other possible reasons could be the loss of volatile aromatic substances responsible for flavour and taste which decreased acceptability in storage at ambient condition. The present findings are in accordance with the view of Baramanray *et al.* (1995) in guava nectar and Thakur and Barwal (1998) in Kiwi fruit squash.

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