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CHANGES IN CHEMICAL CONSTITUENTS AND OVERALL ACCEPTABILITY OF AONLA-MANGO LOW CALORIE BLENDED BEVERAGES DURING STORAGE

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Abstract

Studies were undertaken to evaluate changes in chemical constituents and overall acceptability of aonla-mango low calorie blended beverages during storage in 2010-11. Low calorie RTS (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 13 per cent total soluble solids and 0.3 per cent acidity), nectar (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 15 per cent total soluble solids and 0.25 per cent acidity) and squash (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 47 per cent total soluble solids and 1.1 per cent acidity) were prepared. These were packed in 200 ml capacity glass bottles and analyzed for various chemicals and sensory parameters at ten months (RTS and Nectar) and for twelve months (Squash) under ambient room temperature (28-35^{o}C). Browning of RTS, nectar and squash did not alter up to six months of storage and from the seventh month, it increased slightly up to the end of experiment. Increase in browning was found to be non-significant up to nine months of storage in RTS and nectar, but in squash it was found non-significant during the entire period of storage. The quality of RTS and nectar was found to be acceptable up to nine months of storage, while the quality of squash was found acceptable up to twelve months of storage.

Key words : Low calorie, RTS, nectar, squash, blended beverage.

Introduction

Aonla (*Embilica officinalis* Gaertn) has great potentiality for processing into a number of quality products owing to its excellent nutritive and therapeutic values, but aonla fruits are astringent and have no attractive colour and flavour therefore, as such it's not much suitable for making of ready-to-serve or other beverages. Mango (cultivar Amrapali) was found to be the most suitable for preparing beverages due to its very attractive orange coloured flesh, consistency and flavour. High carotenoid content in Amrapali give it potential for juice production and blending. Today's consumers expect more and more pleasure from food. They want it be lower in fat, sugar and calories and to be able to maintain or improve their health conditions. These facts resulted in development of sugar free or low calorie sweeteners. Presently, low calorie sweeteners are being used in a wide variety of foods and other items such as jams, pickles, sauces, fruit preserves, soft drinks, ice creams, pharmaceutical products, tooth paste and mouth wash (Cook, 2000). In the present investigation, an attempt has been made to prepare aonla-mango blended beverages and observe their quality during twelve months of storage at ambient room temperature.

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Materials and Methods

Mature aonla (cultivar NA-7), mango (cultivar Amrapali) were taken in the month of December and 1st week of July, respectively. The pulp of aonla and mango were extracted and preserved with 700 ppm potassium metabisulphite. 25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia were selected for standardization of recipe. One litre of each product were prepared according to selected recipes and evaluated through organoleptically. The highest scoring low calorie RTS (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 13 per cent TSS and 0.3 per cent acidity), nectar (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 15 per cent TSS and 0.25

Table 1 : Changes in TSS, acidity, ascorbic acid, non-enzymic browning and organoleptic quality of blended aonla and mango low calorie RTS, nectar & squash beverages during storage at ambient room temperature.

	RTS					Nectar					Squash					
Storage period in months	**TSS (%)**	**Acidity (%)**	**Ascorbic acid (mg/100g)**	**Non-enzymic browning (O.D.)**	**Organoleptic quality**	**TSS (%)**	**Acidity (%)**	**Ascorbic acid (mg/100g)**	**Non-enzymic browning (O.D.)**	**Organoleptic quality**	**Storage period in months**	**TSS (%)**	**Acidity (%)**	**Ascorbic acid (mg/100g)**	**Non-enzymic browning (O.D.)**	**Organoleptic quality**
0	7.1	0.30	34.8	0.12	8.6	9.2	0.25	36.2	0.13	8.9	**0**	26.3	1.10	37.8	0.16	8.5
1	7.1	0.30	33.7	0.12	8.6	9.2	0.25	36.0	0.13	8.9	**1**	26.3	1.10	37.5	0.16	8.5
2	7.1	0.30	33.1	0.12	8.6	9.2	0.25	35.6	0.13	8.9	**2**	26.3	1.10	36.2	0.16	8.5
3	7.1	0.30	32.3	0.12	8.6	9.2	0.25	34.2	0.13	8.9	**3**	26.3	1.10	35.5	0.16	8.5
4	7.1	0.30	31.1	0.12	8.5	9.2	0.25	33.1	0.13	8.7	**4**	26.3	1.10	35.3	0.16	8.5
5	7.1	0.30	30.5	0.12	8.5	9.2	0.25	32.7	0.13	8.7	**5**	26.3	1.10	34.8	0.16	8.5
6	7.2	0.31	29.8	0.12	8.5	9.3	0.26	31.5	0.13	8.6	**6**	26.4	1.10	34.2	0.16	8.4
7	7.3	0.31	28.6	0.13	8.4	9.4	0.27	30.3	0.15	8.6	**7**	26.4	1.11	33.7	0.17	8.4
8	7.3	0.30	27.8	0.14	8.4	9.4	0.26	29.8	0.16	8.5	**8**	26.5	1.12	32.7	0.18	8.3
9	7.3	0.30	26.5	0.15	8.2	9.4	0.26	28.5	0.17	8.4	**9**	26.5	1.12	32.1	0.19	8.2
10	7.2	0.29	25.4	0.16	7.7	9.3	0.25	27.3	0.19	7.9	**10**	26.7	1.13	31.6	0.20	8.2
CD at 5%	NS	NS	6.2	0.03	0.40	NS	NS	5.9	0.04	0.51	**11**	27.7	1.13	30.7	0.21	8.1
											12	27.7	1.13	29.8	0.22	8.0
											CD at 5%	NS	NS	5.7	NS	NS

per cent acidity) and squash (25 per cent aonla pulp + 75 per cent mango pulp + 50 per cent sugar + 50 per cent stevia with 47 per cent TSS and 1.1 per cent acidity) were selected for storage studies. Ten litre low calorie RTS, nectar and squash beverages were prepared by mixing calculated amount of pulp, sugar, stevioside, citric acid and water according to different recipes. For the formulation of recipes the total soluble solids and total acidity present in the pulp were first determined and then remaining amount of sugar and citric acid was adjusted. Sugar syrup was prepared by heating the mixture of sugar, stevioside, water and citric acid and thereafter, it was strained through muslin cloth. Finally, pulp was blended with syrup and bottled in 200 ml capacity of bottle by leaving 2 cm head space then crown corked. The sealed bottles were pasteurized for 20 minutes in boiling water and air-cooled. The bottled RTS, nectar and squash were kept till the acceptance quality of the product for storage studies under ambient room temperature.

Results and Discussion

Total soluble solids of RTS, nectar and squash did not change up to five months of storage and thereafter, it increased gradually up to the end of experiment. Acidity of RTS and nectar did not change up to five months of storage and thereafter it increased slightly till seven months of storage. Ascorbic acid content of all the three products declined continuously during the entire period of storage. Browning of RTS, nectar and squash did not alter up to six months of storage and from the seventh month it increased slightly up to the end of experiment. The organoleptic quality score of RTS and nectar did not change up to three months of storage, while in case of squash organoleptic score did not alter up to five months of storage thereafter, it decreased gradually with the storage period. The quality of RTS and nectar was found to be acceptable up to nine months of storage, while the quality of squash was found acceptable up to twelve months of storage.

Sharma *et al*. (2012) reported that in guava-jamun ready-to-serve (RTS) drink and squash were analyzed for chemical constituents at monthly interval for three months storage period. Total sugars, reducing sugars and acidity increased, while ascorbic acid, anthocyanins and total phenols decreased in both the beverages with increase in storage duration. Overall acceptability of beverages increased by blending guava pulp with jamun pulp in comparison to guava or jamun pulp used alone for the preparation of beverages. Sharma (2006) in aonla-ginger, aonla-lime and lime-ginger RTS (without stevia) did not alter up to 45, 30 and 45 days of storage at 25 ± 2^0C. The corresponding period was however prolonged to 60, 75 and 60 days of storage in case of low calorie RTS. Decreasing trends of organoleptic score were observed in different blended beverages during storage by several workers (Deka *et al.*, 2005, Poonam and Tandon, 2007 and Irfan *et al.,* 2008). Sharma (2006) studied on low calorie aonla-ginger, aonla-lime and lime-ginger RTS beverages and reported that the organoleptic quality of all the beverages decreased continuously with the progress of the storage period and the replacement of sugar with stevia up to a level of 50 or 75 per cent was resulted into improving the acceptable storage life of all the beverages. Punam *et al.* (2012) reported that in bael-mango ready-to-serve (RTS) drink and squash were developed and evaluated for its chemical and quality parameters at monthly interval for three months storage period. Total sugars and acidity increased, while total carotenoids decreased in both the beverages with the increase in storage period. The colour and appearance, flavour, taste, mouth feel and overall acceptability of bael-mango beverages decreased significantly with the advancement in storage period, however, their overall rating remained above the acceptable level even after three months storage. Bhattacherjee *et al.* (2012) observed that changes in colour and quality parameters of aonla juice at different storage temperatures. Juice extracted from aonla cv. NA-7, pasturized at 90^0C and preserved with 500 ppm SO_2 in glass bottles was stored at low (8-10^0C), room (20-30^oC) and high (38-40^0C) and found that high temp storage of juice is not desirable due to rapid browning and loss in nutritional quality.

Conclusion

The results of present investigation reveal that stevia can be successfully used to partially replace sugar in the preparation of aonla-mango low calorie quality beverages. The replacement of sugar with stevia up to a level of 50 per cent was resulted into improving the acceptable storage life of all the beverages. This may have excellent marketing potential on account of their nutritive, medicinal, organoleptic quality and reasonable shelf-life. However, very little work is needed for improvement of these products on commercial scale like homogenization, filling technology in pet bottles and their storage life at ambient room temperature.

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