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Juice blends - A way of utilization of under-utilized fruits

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ABSTRACT : The post-harvest shelf-life of maximum of fruits is very limited due to their perishable nature. In India more than 20-22 per cent of fruits are spoiled before utilization. Despite being the world's second largest producer of fruits, in India only 4 per cent of the total fruits produced are processed. Maximum amounts of fruit juices turn bitter after extraction due to conversion of chemical compounds. In spite of being under-utilized, the utilization of highly nutritive fruits and vegetables is very limited due to high acidity, astringency, bitterness and some other factors. While improving flavour, palatability and nutritive and medicinal value of various fruit juices such as aonla, mango, jackfruit, guava and jamun, used for juice blending. All these natural products are valued very highly for their refreshing juice, nutritional value, pleasant flavour and medicinal properties. Fruits are also a rich source of sugars, vitamins and minerals. However, some fruits have an off flavour and bitterness although they are an excellent source of vitamins, enzymes, and minerals. Therefore, blending of two or more fruit juices for the preparation of nutritive ready-to-serve (RTS), beverages is thought to be a convenient and economic alternative for utilization of these fruits. Moreover, one could think of a new product development through blending in the form of a natural health drink, which may also serve as an appetizer. The present investigation focuses on the blending of fruits, under-utilized fruits in appropriate proportions for the preparation of natural fruit based nutritive beverages.

KEY WORDS : Aonla, Mango, Guava, Jackfruit, Jamun, Under-utilized fruit, RTS, Nectar, Squash

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Aonla has great potentially owing to its excellent nutritive and therapeutic values, but aonla fruits are astringent and have no attractive colour and flavour, therefore, as such its not much suitable for making of ready to serve or other beverages. The horticultural produce indigenous to India, like aonla (*Emblca officinalis* Gaertn.), mango (*Mangifera indica* L.), guava (*Psidium guajava* L.), jackfruit (*Artocarpus heterophyllus* Lam.) and jamun (*Syzygium cuminii* Skeels) are well known for their nutritional and medicinal properties. These fruits are perishables in nature, therefore, may have enormous potential if converted into nutritious beverages with exotic taste.

Mango cv. 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.

Chauhan *et al.* (2005) stated that aonla 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.

Guava cv. ALLAHABAD SAFEDA is the most

important cultivar of Uttar Pradesh. Fruits are medium, round smooth, skin colour yellowish white, white fleshed, sweet, strongly flavoured with few seeds and potential for juice production and blending. Attractive colour, nutritional and therapeutic value in jamun gives it potential for preparation of blended beverages. There is great possibility of obtaining an excellent quality beverages, if aonla pulp is blended with guava, jamun, jackfruit and mango pulp, because guava have pleasant flavour and rich source of vitamin C, minerals and antioxidant value. Mango and jackfruit are well known for its attractive colour, pleasant flavour and are also rich in vitamin A. Jamun is a rich source of mineral constituent particularly iron, calcium, phosphorus, vitamin A and C content, it is very well known for curing diarrhoea and diabetic both. The formulation of mixed fruit, vegetable and spice juice beverage is extremely useful for satisfying consumer tastes and preferences. These juices have a longer self-life (3- 6 months) without having any microbial infestations of juices. Therefore, there is a great potential for utilization and commercialization of mixed fruit, vegetable and spice juice beverage as a natural health drink from major and underexploited fruits not only in the domestic market but also at the export front (Bhardwaj and Pandey, 2011).

RESEARCH METHODS

Mature aonla (cultivar NA-7), mango (cultivar

Amrapali), jackfruit (cultivar NJ3) and ripe guava (cultivar Allahabad Safeda) were taken from the Main Experimental Station of Department of Horticulture, Narendra Dev University of Agriculture and Technology, Faizabad in the month of December, 1st week of July, 2nd week of July and August, respectively. Ripe jamun (round shaped) were taken from the village Singhni in the month of June. The pulp of each fruit was extracted and preserved with 700 ppm potassium metabisulphite (mango, guava, jackfruit and aonla), 1400 ppm sodium benzoate (jamun) and kept till the preparation of final product. One litre of each *i.e.* RTS, nectar and squash were prepared by mixing calculated amount of both the pulp, sugar, citric acid and water according to different blending ratio. The following blending ratios were tested for preparation of aonla based blended RTS, nectar, squash and evaluated for their organoleptic quality (Table A).

Statistical analysis :

The obtained data was analyzed by statistical significant at $P < 0.05$ level, S.E. and C.D. at 5 per cent level by the procedure given by (Gomez and Gomez, 1984).

RESEARCH FINDINGS AND DISCUSSION

Result of present studies showed the possibility of obtaining acceptable beverages which possessed

Sr. No.	Blending ratio	Beverages		
		RTS	Nectar	Squash
1.	25 % aonla pulp + 75 % mango pulp	10% pulp adjusted	20% pulp adjusted to	25% pulp adjusted to
2.	50 % aonla pulp + 50 % mango pulp	to 0.3% acidity and	0.3% acidity and 14%	1.0% acidity and
3.	75 % aonla pulp + 25 % mango pulp	12% TSS	TSS	45% TSS
4.	100 % aonla pulp			
5.	100 % mango pulp			
6.	25 % aonla pulp + 75 % guava pulp			
7.	50 % aonla pulp + 50 % guava pulp			
8.	75 % aonla pulp + 25% guava pulp			
9.	100 % guava pulp			
10.	25 % aonla pulp + 75 % jamun pulp			
11.	50 % aonla pulp + 50 % jamun pulp			
12.	75 % aonla pulp + 25 % jamun pulp			
13.	100 % jamun pulp			
14.	25 % aonla pulp + 75 % jackfruit pulp			
15.	50 % aonla pulp + 50 % jackfruit pulp			
16.	75 % aonla pulp + 25 % jackfruit pulp			
17.	100 % jackfruit pulp			

attractive colour, prominent taste with good flavour and consistency by blending of aonla pulp with different ratios of mango, guava, jackfruit and jamun pulp. A blends containing 25 per cent aonla pulp + 75 per cent mango pulp was found better for the preparation of RTS, nectar and squash beverages (Table 1). Gehlot *et al.* (2012) reported that RTS drink prepared with 20 per cent pulp (25 Bael : 75 Mango), 14 per cent TSS and 0.26 per cent acidity was found most acceptable (8.59), while in squash prepared with 40 per cent pulp (25 Bale : 75 Mango), 50 per cent TSS and 1.00 per cent acidity was found most acceptable (8.60). Sharma *et al.* (2012) also reported that in RTS drink maximum acceptability (8.41) was achieved with 20 per cent pulp (50 guava : 50 jamun), 14 per cent TSS and 0.25 per cent acidity, while in squash, maximum acceptability (8.43) was achieved in beverage blends (50 guava: 50 jamun) with 40 per cent pulp, 50 per cent TSS and 1.00 per cent acidity. Byanna and Doreyappa Gowda (2010) found that RTS with 18 per cent juice, 15 °Brix and 0.3 per cent acidity, Nectar with 24 per cent juice, 15 °Brix, 0.3 per cent acidity, squash with 35 per cent juice, 40 °Brix, 1.0 per cent acidity, sweet orange : kokum (88:12), 15 per cent juice, 15 °Brix, 0.3 per cent acidity, sweet orange:

pomegranate (50:50), 15 per cent, 15 °Brix, 0.3 per cent acidity were found to be superior recipes organoleptically. Similar findings were also reported by Chandan *et al.* (2012); Jain and Meena (2013) on aonla and kinnow mandarin beverage. Bhosale *et al.* (2000) reported that the RTS prepared from 80 : 20 (aonla : mango) blend had better consumer appeal and nutritional value. The proportion of aonla juice decreased, ascorbic acid content also decreased. Organoleptic score. Gehlot *et al.* (2012) state that in RTS drink prepared with 20 per cent pulp (25 bael: 75 mango), 14 per cent TSS and 0.26 per cent acidity was found most acceptable (8.59), while in squash prepared with 40 per cent pulp (25 bael : 75 mango), 50 per cent TSS and 1.00 per cent acidity was found most acceptability (8.60). Karanjalkar *et al.* (2013). Studied on the development and evaluation of protein enriched guava nectar blended with soymilk and the results found were more of less similar to the present investigation. These superior recipes were used to prepare the products with sugar substitutes based on the sugar equivalents. Sugar substitutes were used in place of sugar for preparation of products. The results are in conformity with findings of Joshi *et al.* (2012) in the preparation of tamarind RTS beverages.

Table 1 : Organoleptic quality of different blending ratio of aonla pulp with mango, guava, jamun and jackfruit pulp for blended RTS, nectar and squash

Sr. No.	Blending ratio	Organoleptic quality					
		RTS		Nectar		Squash	
		Score	Rating	Score	Rating	Score	Rating
1.	25 % aonla pulp + 75 % mango pulp	8.6	LE	8.9	LE	8.5	LE
2.	50 % aonla pulp + 50 % mango pulp	7.7	LVM	8.3	LVM	7.7	LVM
3.	75 % aonla pulp + 25 % mango pulp	6.4	LS	6.7	LM	6.3	LS
4.	100 % aonla pulp	6.1	LS	6.2	LS	6.0	LS
5.	100 % mango pulp	7.2	LM	7.4	LM	7.1	LM
6.	25 % aonla pulp + 75 % guava pulp	6.2	LS	6.3	LS	6.1	LS
7.	50 % aonla pulp + 50 % guava pulp	6.4	LS	6.5	LS	6.3	LS
8.	75 % aonla pulp + 25% guava pulp	7.9	LVM	8.1	LVM	7.9	LVM
9.	100 % guava pulp	6.1	LS	6.3	LS	6.2	LS
10.	25 % aonla pulp + 75 % jamun pulp	6.2	LS	6.3	LS	6.1	LS
11.	50 % aonla pulp + 50 % jamun pulp	6.3	LS	6.4	LS	6.2	LS
12.	75 % aonla pulp + 25 % jamun pulp	6.6	LM	6.8	LM	6.5	LM
13.	100 % jamun pulp	6.0	LS	6.1	LS	6.0	LS
14.	25 % aonla pulp + 75 % jackfruit pulp	6.2	LS	6.1	LS	6.1	LS
15.	50 % aonla pulp + 50 % jackfruit pulp	6.3	LS	6.2	LS	6.2	LS
16.	75 % aonla pulp + 25 % jackfruit pulp	6.8	LM	7.0	LM	6.7	LM
17.	100 % jackfruit pulp	6.0	LS	6.1	LS	6.0	LS
C.D. (P=0.05)		0.93		0.91		0.82	

LM- Like moderately, LVM-Like very much, LE-Like extremely, LS-Like slightly, NLND- Neither like nor dislike

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