The Pharma Innovation Journal 2021; 10(12): 1177-1179

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(12): 1177-1179

www.thepharmajournal.com
Received: 07-10-2021
Accepted: 18-11-2021

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Effect of sugar and citric acid variation on organoleptic quality of freshly prepared Jamun fruit bar

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Abstract
In the present investigation efforts have been made with an objective of process standardization and organoleptic evaluation of freshly prepared jamun fruit bar. Jamun fruits of Konkan Bahadoli variety were used for preparation of jamun bar. The bar was standardized by using different level of sugar and citric acid to select the optimum level of each ingredient. The sugar level used as 30, 40, 50 and 60 percent whereas citric acid level used as 0.30, 0.40, 0.50 and 0.60 percent, respectively. The best treatment CC2 with 50 percent sugar and 0.40 percent citric acid was selected on the basis of organoleptic evaluation.

Keywords: Jamun, bar, sugar, citric acid, organoleptic evaluation

Introduction
Jamun, *Syzygium cumini* (L.) Skeels, the Indian blackberry is called the fruit of gods, belonging to family Myrataceae. The other names are Jamun, Jambul, Black plum, Java plum, Indian blackberry and Jamblang. It is fruit from a very large ever green tropical tree with property of astringent and purple-skinned fruit, native to India, Nepal, Pakistan, Sri Lanka, Indonesia, Bangladesh, and Philippines (Menka and Venkatasubramanian, 2017) [1]. Drying of agricultural produce is the oldest and most widely used preservation method. It involves the reduction of as much water as possible from the fresh fruit to arrest enzyme and microbial activities, hence, stopping deterioration (Teshome, 2010) [4]. Fruit bar is a confectionery product, prepared by drying of fruit pulp after mixing with appropriate quantities of sugar, acid and other ingredients. It is also called fruit slabs or fruit leather. It can be prepared from a wide variety of fruits including guava, banana, papaya, mango, sapota, apple, jackfruit etc. Most of the commercially available fruit bars (except mango leather) are synthetic in nature and without fruit pulp. Natural fruit pulp-based fruit bars are more nutritious and organoleptically acceptable since substantial quantities of dietary fibers, minerals and vitamins are the constituents of finished product (Sharma *et al*., 2013) [2]. Hence by keeping these points in mind present investigation was carried out to prepare and analyze jamun bar.

Materials and Methods
Fresh jamun Cv. Konkan Bahadoli were obtained from Central Nursery Scheme, VNMKV Parbhani. The other raw materials like sugar and citric acid were procured from the local market of Parbhani, Maharashtra.

Standardization of ingredient level for jamun bar
The jamun bar was standardized by using different level of sugar and citric acid to select the optimum level of each ingredient. The sugar level used as 30, 40, 50 and 60 percent whereas citric acid level used as 0.30, 0.40, 0.50 and 0.60 percent (table-1)

Table 1: Treatment details for jamun bar

Sample		Ingredient			Sample		Ingredient		
		Pulp (%)	Sugar (%)	Citric Acid (%)			Pulp (%)	Sugar (%)	Citric Acid (%)
	Control	100	-	-		-	-	-	-
A	A1	100	30	0.30	C	C1	100	50	0.30
	A2	100	30	0.40		C2	100	50	0.40
	A3	100	30	0.50		C3	100	50	0.50
	A4	100	30	0.60		C4	100	50	0.60
B	B1	100	40	0.30	D	D1	100	60	0.30
	B2	100	40	0.40		D2	100	60	0.40
	B3	100	40	0.50		D3	100	60	0.50
	B4	100	40	0.60		D4	100	60	0.60

Where
A=30 % sugar, B=40 % sugar, C=50 % sugar, D=60 % sugar

Preparation of jamun bar from jamun Cv. Konkan Bahadoli

Jamun bar was prepared by using modifying the method given by Sharma *et al.* (2013) [2] and Shere *et al.* (2014) [3].

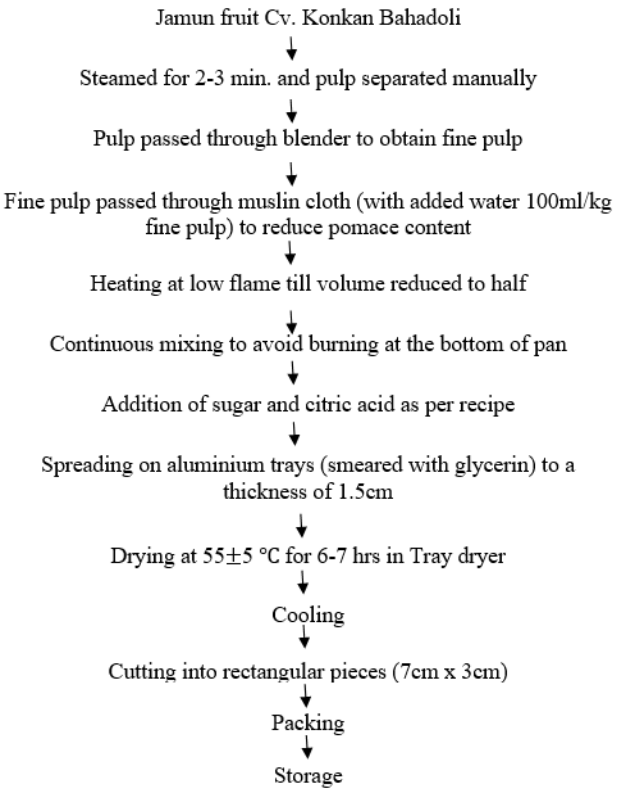


Fig 1: Flow sheet for preparation of jamun fruit bar

Result and Discussion
The jamun bar was prepared by different levels of sugar and citric acid and further subjected to organoleptic evaluation. The results obtained are summarized in following headings and presented in table-2.

Color
It can be seen very clearly from table 2 that there is progressive increase in color score with increase in percentage of sugar and citric acid in pulp. There was increase in color intensity from 6.0 at 30 percent sugar level to 9.0 at 50 percent sugar level and above 0.40 percent acid level. This indicates that higher percentage of sugar helps in increase the color score of the product. It can be also clearly seen that increase in citric acid level has positive effect on the color score. The best color of the product was obtained 50 percent sugar and 0.40 percent citric acid level in the product.

Taste and Flavor
Table 2 revealed that taste and flavor of the product was significantly affected with increase in level of sugar however, higher level of citric acid did not show significant improvement in taste and flavor acceptability of the product. Moreover, at higher level (> 0.40) acid decreases the acceptability score significantly. Most of the panel member ranked highest score at 50 percent sugar with 0.40 percent acid (CC2). It clearly indicates that higher level of citric acid in the product decreases taste and flavor score. This may due to increased sour taste of final product.

Texture
Texture of the product was improved with increase in sugar level in some extend however; lower or higher level of sugar in the products adversely affects the texture of the products. The textures score was found to be decreased at 0.40, 0.50 and 0.60 percent level of citric acid in the product. The optimum score was recorded at 50 percent sugar level with 0.40 percent citric acid (CC2).

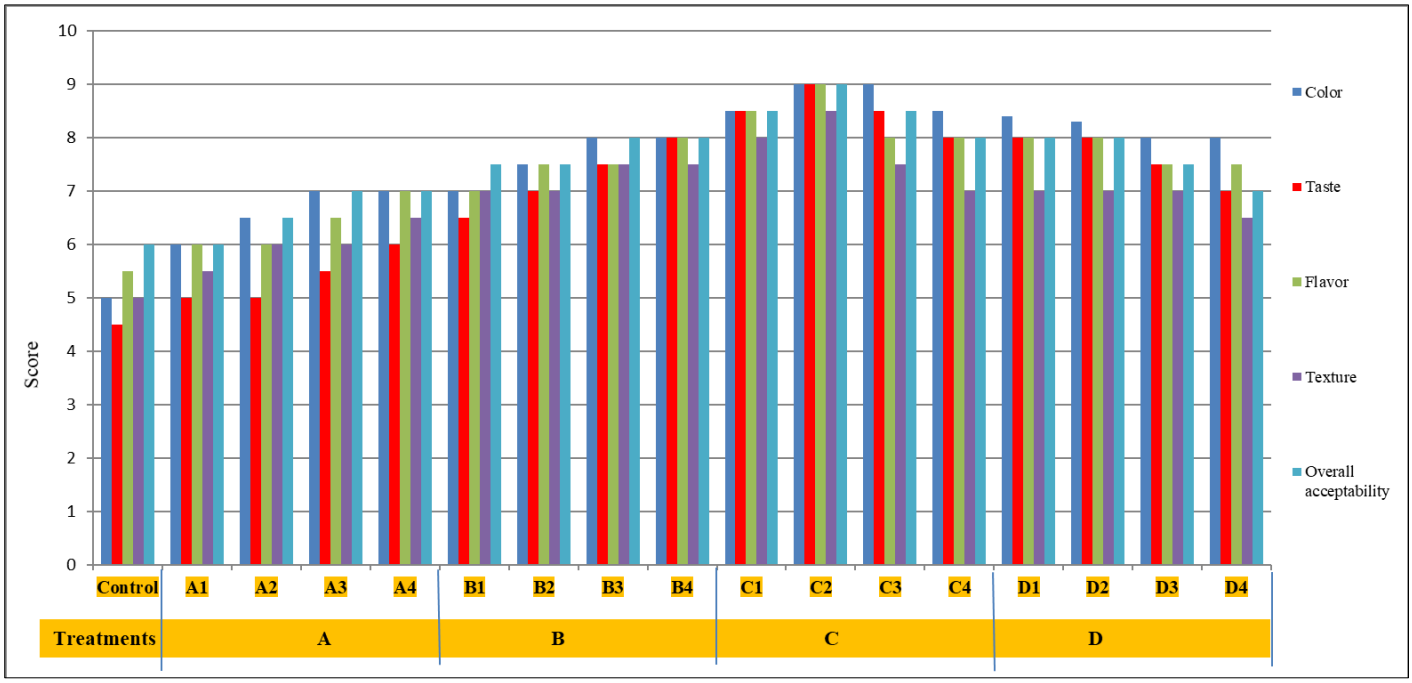
Overall acceptability
The overall acceptability of the sample CC2 was also higher (9.0) as compared to all other treatments. Most of the panel members ranked first to the bar with 50 percent sugar level with 0.40 percent citric acid (graph-1).

Table 2: Effect of sugar and citric acid variation on organoleptic quality of freshly prepared jamun bar

Sample		Color	Taste	Flavor	Texture	Overall acceptability
Control		5	4.5	5.5	5	6
A	A1	6.0	5.0	6.0	5.5	6.0
	A2	6.5	5.0	6.0	6.0	6.5
	A3	7.0	5.5	6.5	6.0	7.0
	A4	7.0	6.0	7.0	6.5	7.0
	SE±	0.18	0.15	0.22	0.23	0.15
	CD at 5%	0.62	0.53	0.74	0.78	0.50
	B1	7.0	6.5	7.0	7.0	7.5

B	B2	7.5	7.0	7.5	7.0	7.5
	B3	8.0	7.5	7.5	7.5	8.0
	B4	8.0	8.0	8.0	7.5	8.0
	SE±	0.16	0.13	0.21	0.21	0.18
	CD at 5%	0.56	0.44	0.70	0.71	0.60
C	C1	8.5	8.5	8.5	8.0	8.5
	C2	9.0	9.0	9.0	8.5	9.0
	C3	9.0	8.5	8.0	7.5	8.5
	C4	8.5	8.0	8.0	7.0	8.0
	SE±	0.17	0.30	0.19	0.33	0.30
	CD at 5%	0.57	1.03	0.65	1.10	1.01
D	D1	8.4	8.0	8.0	7.0	8.0
	D2	8.3	8.0	8.0	7.0	8.0
	D3	8.0	7.5	7.5	7.0	7.5
	D4	8.0	7.0	7.5	6.5	7.0
	SE±	0.17	0.30	0.19	0.33	0.30
	CD at 5%	0.57	1.03	0.65	1.10	1.01

* Each value is an average of three replications



Graph 1: Effect of sugar and citric acid variation on organoleptic quality of freshly prepared jamun bar

Conclusion

Jamun fruit bar was prepared by varying the level of sugar and citric acid. The sugar levels used were 30, 40, 50 and 60 per cent whereas citric acid level used were 0.30, 0.40, 0.50 and 0.60 per cent, respectively. Prepared jamun bar was subjected to organoleptic evaluation and based on panel score 50 per cent sugar and 0.40 per cent citric acid (CC2) was found to be best among all treatments.

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