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Original Article

Physio-chemical and Acceptability Analysis of Tamarind Plum Squash at Different Concentrations

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ABSTRACT

Tamarind plum containing red flesh, peeled are very exciting fruit due to their high content on bioactive compounds, such as the anthocyanins and other polyphenolic compounds with a high antioxidant capacity. These natural substances found in plum acts to prevent diseases such as diabetes and cancer. In this study squash was prepared with Tamarind plum.**Objective:** To find out Physio-chemical and acceptability analysis of tamarind plum at different concentrations.**Methods:** The tamarind plum was used to prepare squash with different percentage of tamarind juice and plum juice but at same percentage of sugar, water and sodium benzoic acid. Prepared squash was filled in polyethylene terephthalate bottles and analyzed after 0, 15, 30, 45, 60, 75 and 90days of storage. The Tamarind plum squash was subjected to Total Phenolic compounds,pH and Ascorbic acid. **Result:** Ascorbic Acid (33.46), pH (2.29) and TPC (0.78) were observed in squash prepared using tamarind juice (350ml), plum juice (400), sodium benzoic acid, sugar and water (2g, 1kg and 250ml). Storage showed significant effect on Ascorbic Acid and pHduring ninety days storage.**Conclusion:** On the basis of above results it was concluded that sample TPS3 show best in keeping quality during storage time intervals. Hence, the results of sample TPS3 of tamarind plum blended squash is more recommended in terms of commercial use and for large scale industrial production. Squash prepared from tamarind and plum are more acceptable to consumers because of sour test, need commercialization.

INTRODUCTION

Tamarind indica L.(Tamarind) belongs to family Caesalpiniaceae [1]. Tamarind abundantly grow in tropical regions of Africa whereas it also sufficiently grow in south and north America. Subtropical regions of Pakistan, China, India, Spain, Indonesia and Thailand also produced significant amount of naturalized tamarind [2,3]. There are many therapeutic benefits of Tamarind. Its fruit can be used as laxative, expectorant and carminative [4]. Different countries such as America, Africa and Asia use it for many medicinal purposes [5]. Loss of fresh taste, color and easily spoilage are some unpleasant characteristics of tamarind [6]. Tamarind juice has hypoglycemic potential. Tamarind pulp is sour in taste that's why use in many foods for souring flavor such as sauces, chutneys, curries and sambar [7]. Tamarind also use in the manufacturing of many ready to eat foods such as ice-cream and jellies. Most of the population also use it as refreshing beverages and drinks [8,9]. Fruits can be processed as pulp, juices, punch, glazed and concentrates. Thermal processing is used to preserve fruits pulp which can latterly be used in different food products with same natural tastes and flavor [10]. It is different to separate tamarind fruit pulp because it is low in water content. Some conventional methods such as maceration, soaking and straining are used to extract pulp from fruit [11]. These techniques make the extraction easier. Tamarind pulp is loaded with reducing sugars, pectin, tartaric acid, cellulose material, proteins and fibers [12]. Different soft drinks use for refreshing purposes contain significant amount of tamarind juice [13]. In summers the demand of these drinks is high and people consume on regular basis. Manufacturing and sale of these beverages contribute to increase income of a country.

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Fruit beverages contain fruit juices, pulp, sweeteners, flavors and preservatives[14,15].

METHODS

Procurement of raw material: Matured plum and tamarind were purchased from the local market of Lahore. Tamarind plum squash was prepared in the food science lab of The University of Lahore.

Sorting, blending, extraction of fruits and Formation of Squash: Immature and spoiled fruits (plum and tamarind) were sorted out and washed. Peel and seeds were separated prior to extraction. Pulping machine was use to extract pulp of fruits[ ]. Pulp, sugar and water were added to form squash with the ratio of 3:4:1[12].

Benzoic Acid (%)

Treatments	Tamarind juice (ml)	Plum juice (ml)	CMC (g)	Sugar (kg)	Water (ml)	Sodium Benzoic Acid
TPS1	550	200	2	1	250	0.1
TPS2	450	300	2	1	250	0.1
TPS3	350	400	2	1	250	0.1

TPS: tamarind plum sample

Table 1: Proposed plan of study for research

Treatments Tamarind juice (ml) Plum juice (ml) CMC (g) Sugar(kg)Water(ml)Sodium

Physio-chemical analysis: Physio-chemical properties of tamarind plum squash were determined. pH, phenolic content and Ascorbic acid levels were measured[17].

pH: pH is the hydrogen ion concentration in any product. Its value ranges from 1-14. 7 is considered as neutral. pH scale normally use to check acidity and alkalinity of sample. To check pH 10ml of squash was added in beaker and put the electrodes. Results were noted to find out pH of the sample, proper method of AOAC 2007.02 were applied[13].

Ascorbic acid content:

Formulation of standard solutions: Sodium bicarbonates (40mg) and 2,6 dichlorophenol indophenols (50mg) dyes were used in 250ml of distilled water. Took 50 mg of ascorbic acid and .4% oxalic acid to form standard solution of ascorbic acid. After formation of standard solution this solution was kept for one day to settle down. 5ml standard ascorbic acid solution was titrated untill pink color appeared. After that dye factor was calculated by using formula

$$\text{Dye factor (F)} = \frac{\text{Standard Ascorbic acid in ml}}{\text{Amount of dye}}$$

Sample titration: 0.4% oxalic acid was added to blended squash to make solution of 100ml. 10ml of this solution was titrated until it converted into pink. Formula use to calcute ascorbic acid content was:

$$\text{Ascorbic acid} = \frac{\text{Dye factor} \times T \times 100}{S \times D}$$

T = pigment used in ml, D = diluted solution, S = sample for titration

Packaging and storage: After preparation and physio-chemical analysis blended tamarind plum squash was packed in polyethylene terephthalate bottles at room temperature.

RESULTS

Highest mean value of PH was 2.76 having the concentration of tamarind juice 350 ml and plum juice 400 ml in the squash. The lowest pH 2.75 was noted in drink concentration of tamarind juice 550 ml and plum juice 200 ml. Range of pH was 2.79 to 2.83 during storage period of 90 days (Table 2). Highest mean value of Ascorbic Acid was 33.46% having the concentration of tamarind juice 350 ml and plum juice 400 ml in the squash. The lowest ascorbic acid (32.12%) was noted in squash of tamarind juice 550 ml and plum juice 200 ml. Range of Ascorbic Acid was 26.06 % to 27.35% in storage period of ninety days (Table 3).

pH

Treatments	Storage at different Concentration							Decrease	Mean
	00	15	30	45	60	75	90	%	
TPS1	2.72	2.73	2.74	2.75	2.76	2.78	2.79	2.57	2.75±0.06c
TPS2	2.72	2.74	2.75	2.76	2.78	2.79	2.78	2.20	2.76±0.04b
TPS3	2.75	2.76	2.77	2.79	2.81	2.82	2.83	2.90	2.79±0.05a
Mean	2.73	2.74	2.75	2.76	2.78	2.79	2.56		

Table 2: The pH of Juice acquires by mixing of Fruit juice at Various stages, a-g Values of alphabets demonstrate (P less than 0.05) difference

Ascorbic acid (Vitamin C)

Treatments	Storage at different Concentration							Decrease	Mean
	00	15	30	45	60	75	90	%	
TPS1	37.91	35.87	35.01	33.11	29.64	27.28	26.06	32.73	32.12±0.03b
TPS2	38.10	37.28	34.09	32.19	30.31	28.77	26.55	31.07	32.47±0.04b
TPS3	39.83	37.67	35.12	33.43	31.11	29.74	27.35	30.12	33.46±0.02a
Mean	38.61	36.94	34.74	32.91	30.35	28.59	26.65		

Table 3: Ascorbic acid in Juice ready by mixing juice of tamarind at plum at various levels, a-g Values of alphabets demonstrate (P less than 0.05) difference.

Total Phenolic Content

Treatments	Storage at different Concentration							Decrease	Mean
	00	15	30	45	60	75	90	%	
TPS1	1.23	1.12	0.92	0.87	0.72	0.67	0.60	51.21	0.87±.04c
TPS2	0.89	0.80	0.73	0.68	0.61	0.52	0.43	51.68	0.66±.03a
TPS3	1.01	0.95	0.86	0.79	0.69	0.63	0.57	51.66	0.78±.05b

Table 4: Total phenol content "Phenolics (mg GAE/100g)"of Juice made from integration ofjuice at different stages, a-g Values of alphabets demonstrate (P less than 0.05) difference

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Overall acceptability

Treatments	Storage at different Concentration							Decrease	Mean
	00	15	30	45	60	75	90	%	
TPS1	8.2	7.9	7.5	7.1	6.6	6.0	5.4	34.15	6.96±.04c
TPS2	8.0	7.8	7.6	7.5	7.4	7.1	6.9	13.75	7.47±.06ba
TPS3	8.1	8.0	7.8	7.5	7.4	7.1	7.0	13.58	7.56±.03a

Table 5: The overall acceptance of Juice at different stages. a-g Values of alphabets demonstrate (P less than 0.05) difference.

DISCUSSION

A study observed the increase of pH at 90 days storage study in Tamarind Plum at ambient temperature [18]. In storage study of a squash it was suggested that Vitamin C is sensitive to heat, oxygen and light which goes to oxidized in non-enzymatic and enzymatic catalysts. At ambient temperature of storage ascorbic acid level was decreased in a tamarind plum squash [18]. The absolute phenol substance of the mixed Juice increments significantly ($P<0.05$) on time stretch. The general absolute phenol of Juice at introductory time from 196 (TPS1) to 201 (TPS2), which increment bit by bit from 495.6 (TPS3) to 485 (TPS1) during the 90 days of capacity timeframe. The most elevated score of mean 387.91 was seen at TPS2, while least value 383.5 was seen at TPS3 (Table 4). The most noteworthy percent expansion of 30.56 was recorded at TPS3, while least number expansion of 27.98 was seen at TPS2 [19]. The adequacy of generally speaking nature of the mixed Juice diminishes extensively ($P<0.05$) on the two medicines and capacity time stretch. The general acknowledgment rate of Juice at introductory time from 8.2 (TPS1) to 8.0 (TPS2), was steadily from 7.0 (TPS3) to 5.4 (TPS1) during the 3 months of capacity timeframe (Table 5). Mean an incentive for generally speaking acknowledgment 8.15, that abatement reduced to 6.43 through the capacity time frame [20].

CONCLUSION

Tamarind plum mixed Juice was done with various extents. Concoction additives were utilized to hinder the development of microbial action in mixed Juice. The tamarind juice drink has high amount of vitamin C, antioxidant activity and total poly-phenols.However, at 28°C these compounds were lost during three months (storage). As the supplementation level of tamarind plum squash increase from tamarind juice 350 ml and plum juice 400 ml pH and Ascorbic Acid was increased.The data had a critical impact on taste color & overall acceptability through capacity and cure time spans. Mix Juice is more suggested regarding business use and for huge scope mechanical creation.

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