

Formulation and Analysis of Papaya and Carrot based Squash

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Abstract: *Fruit and vegetable combination beverages have higher nutritional, medicinal and calorific values compared to synthetic beverages. Considering the nutritional and therapeutic value of papaya and carrot, different combinations of Squash was formulated and its quality characteristics were analysed. Papaya and carrot juice were combined in different proportions (T1-100% papaya; T2-75% papaya 25% carrot; T3-50% papaya 50% carrot; T4-25% papaya 75% carrot; T5-100% carrot) to formulate fruit and vegetable blend squashes. The formulated squash was analysed for physico chemical characteristics and acceptability. Organoleptic evaluation showed that blend with equal percentage (50%) of papaya and carrot squash attained higher scores than other blends.*

Keywords: Squash, Papaya, Carrot

1. Introduction

Fruits and Vegetables are good sources of vitamins, mineral salts and dietary fibre which are essential for good health. India is the world's largest producer of fruits and vegetables with average production of 50 million tonnes of vegetables and 20 million tonnes of fruits [1]. Fruits and Vegetables processing in India is almost equally divided between organized and unorganized sector, with organized sector holding 48 per cent of the share. The installed capacity of fruit and vegetable processing industry has increased from 1.11 million tonnes in 1993 to 2.33 million tonnes in 2004. Over the last few years, industry has seen a positive growth in ready to serve beverages, fruit juices and pulps. The government expects the processing in this sector to grow to 10 per cent in 2015 and 25 per cent of the total produce by 2025 [2].

Papaya (*Carica papaya*) fruits belongs to family *Caricaceae*, one of most important fruits cultivated throughout tropical and subtropical regions of the world. It is a tropical fruit having commercial importance because of its high nutritive value and medicinal value. Carrot (*Daucus carota*) is one of the popular root vegetables grown throughout the world and belongs to the important crop of *Apiacea* family. It is the most important source of dietary carotenoids in Western countries including the United States. The area under carrot cultivation in India is 22,538 hectare with an annual production of 4.14 lakh tonnes [3]. In recent years, the consumption of carotene products have increased steadily due to their recognition as an important source of natural antioxidant besides, anticancer activity of β -carotene being a precursor of vitamin.

Squashes are becoming popular in comparison with synthetic beverages evidently because of their flavour, taste and nutritive value and storage stability. Juice blending is one of the best methods to improve the nutritional quality of the fruit beverages. It can improve the vitamin and mineral content depending on the kind and quality of fruits and vegetable used [4]. As the papaya flavour is not liked by consumers it can be combined with other vegetable

or fruit. Keeping in view of nutritional and functional attributes of papaya and carrots, they have been blended to make squash formulation.

2. Materials and Method

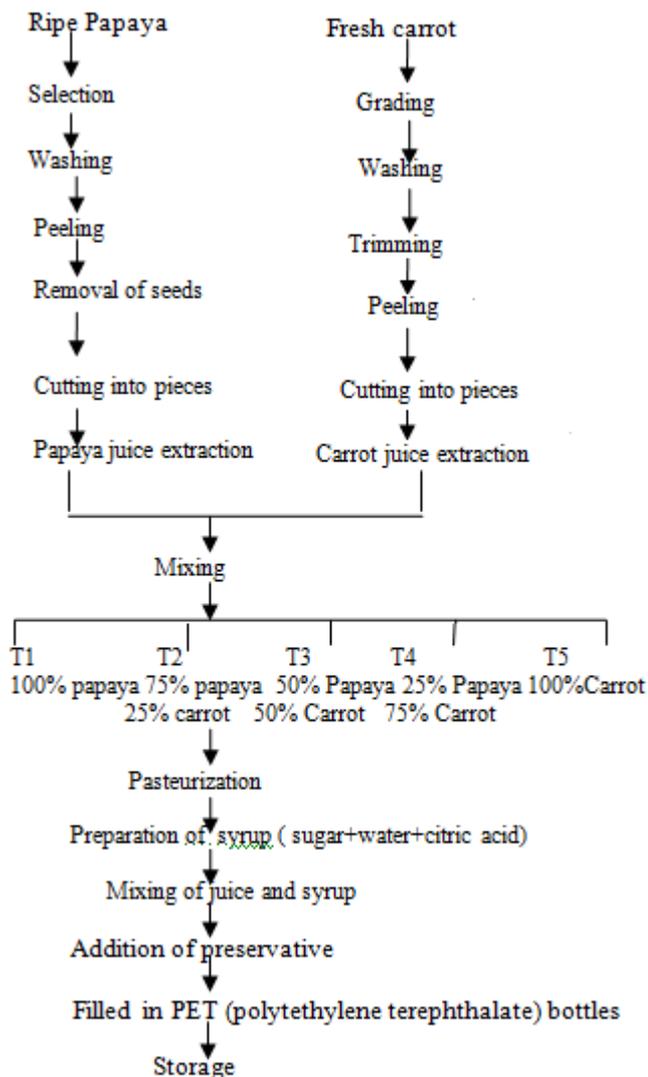
2.1 Extraction of papaya/carrot juice

Ripe papayas and fresh carrots were procured and washed thoroughly in cold water to remove dirt. Immediately after washing, the fruit and vegetable was peeled and sliced. The prepared slices of papaya and carrot were subjected to extraction process.

2.2 Formulation of papaya and carrot blended squash

The extracted papaya and carrot juice was mixed in different proportions as T1 (100% Papaya), T2 (75% papaya +25% carrot), T3 (50% papaya+50% carrot), T4(25% Papaya+75% carrot) and T5(100% carrot). Sugar syrup was prepared with sugar and water. According to Fruit Product Order (FPO) guidelines squash is type of fruit squash containing 25% of fruit juice or pulp, acidity-1% and TSS 45°Br.

The prepared RTS from formulated squash was evaluated for organoleptic characteristics.



3. Results and Discussion

3.1 Physico-chemical characteristics of formulated squash

3.1.1 Moisture content, pH and titrable acidity of freshly prepared squash is presented in Table 1

Table 1: Moisture, ash, pH, titrable acidity of formulated squash

Combination	Moisture (g percent)	Ash (g percent)	pH	Acidity (%)
100% Papaya	82.3	0.21	5.25	1.20
75% Papaya 25% Carrot	83.5	0.40	5.19	0.84
50% Papaya 50% Carrot	88.2	0.71	5.12	0.99
25% Papaya 75% Carrot	89.3	0.96	5.20	0.76
100% Carrot	89.6	0.86	5.90	0.40

Moisture content of formulated squash ranged from 82.3 percent in 100% papaya based squash to 89.6 percent in 100% carrot based squash. Gradual increase was noticed on increasing the addition of carrot juice. Ash content of foodstuff represents inorganic residue remaining after destruction of organic matter. Ash content of formulated fruit and vegetable blend squash ranged from 0.21 in papaya

based squash to 0.86 percent in carrot based squash. Gain in ash content on higher substitution of carrot reflects the mineral content of carrot. pH of different squashes ranged between 5.20 in 100% papaya squash to 5.90 in 100% carrot squash and titrable acidity of squashes ranged from 0.41 in carrot squash to 1.2 percent in 100% papaya squash. The relationship between pH and acidity is interrelated.

3.1.2 Total soluble solids, reducing and non-reducing sugar of freshly prepared squash

TSS, reducing and non reducing sugar is presented in Table 2.

Table 2: TSS, Reducing and non reducing sugar of freshly prepared squash

Combination	Total soluble solids	Reducing sugar	Non reducing sugar
100% Papaya	46	18.1	30.90
75% Papaya 25% Carrot	45	17.2	31.82
50% Papaya 50% Carrot	45	17.8	31.33
25% Papaya 75% Carrot	47	18.2	30.94
100% Carrot	43	19.8	28.12

Total soluble solids content of formulated squash ranged between 43% (100% carrot) and 46% (100% papaya) indicating that the TSS of squash was closer to 45% prescribed for standard squash. Reducing sugar value of formulated squash ranged from 18.1 in 100% papaya squash to 19.8 in 100% carrot squash. Reducing sugar content is relatively high in carrot based squash compared to papaya based squash. Similarly, the non reducing sugar value ranged from 28.1(100 %carrot squash) to 30.9(100% papaya squash).

3.2 Nutrient content of freshly prepared squash

Carbohydrate, protein, calcium and vitamin C content of the formulated squash are presented in Table 3.

Table 3: Nutrient content of formulated squash

Combination	Carbohydrate (g)	Calcium (mg)	Protein (g)	Vitamin C (mg)
100% Papaya	47.87	20	0.07	42.50
75% Papaya 25% Carrot	47.57	45	0.21	30.3
50% Papaya 50% Carrot	47.17	57	0.09	22.16
25% Papaya 75% Carrot	46.36	60	0.16	14.0
100% Carrot	46.26	78	0.05	3.73

Vitamin C content was relatively higher(42.5%) in squash with higher proportion of papaya than others. The energy content in formulated squash ranged from 186 kcal in carrot squash to 193 kcal in 100% papaya squash. The calcium content was lower as 20 mg in carrot compared to papaya containing 78 mg.

3.3 Organoleptic characteristics of prepared RTS beverage

Table 4 shows mean sensory scores obtained for papaya and carrot based RTS beverage

Characteristics	Various proportion of Papaya:Carrot RTS beverage				
	100% Papaya	75:25	50:50	25:75	100% carrot
Colour	7.85	7.75	7.85	7.50	7.80
Flavour	7.10	7.60	8.00	7.40	6.95
Consistency	7.30	7.75	7.85	7.60	7.30
Taste	7.20	7.49	7.50	7.15	6.95
Overall acceptability	7.35	7.60	7.90	7.25	7.20

Considering the quality characteristics, 50% papaya:50% carrot blend RTS beverage secured maximum score for colour (7.85±0.93), consistency (7.85±0.87), flavour (8.00±0.99) taste(7.50±0.94) and overall acceptability (7.90±0.81) compared to other proportions.

4. Conclusion

Thus, it can be concluded that 50% papaya and 50% carrot proportion was better suited for marketing. When compared to synthetic beverages, squashes prepared from papaya and carrot blend provide nutrients like ascorbic acid, β-carotene which is essential for good health.

5. Future Scope of the Study

Utilization of vegetable in squashes so as to improve the nutritive value. The formulation of fruit and vegetable blend squash has a greater scope for utilization and commercialisation of natural health drink.

References

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