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EVALUATION OF PHYSICO-CHEMICAL PROPERTIES OF PRICKLY PEAR FRUIT SQUASH

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ABSTRACT

Prickly pear is an oval fruit with prickly skin and juicy flesh that grows on top of the cactus paddles of the *Opuntia ficus* indica plant. Prickly pears are high in dietary fiber having both soluble and insoluble fibers, which is important for healthy digestion. This fruit contains magnesium, potassium, calcium and Vitamin C which are the important nutrients essential for maintaining a healthy life. The fruit also aids in weight loss and blood sugar control. In this study, various concentrations of prickly pear fruit squash such as Sample A, B, and C were prepared by using a ratio of 1:0.5, 1:1 and 1:1.5 prickly pear fruit pulp and sugar respectively. The developed products were subjected to sensory evaluation using a 5 point Hedonic Rating Scale with the help of 10 well trained panel members to determine the overall acceptability of the samples. The squash in the ratio 1:0.5 of fruit pulp and sugar added in sample A received a higher mean score than other samples. The standardized prickly pear fruit squash contains 82.06 % moisture, 5.4 of pH, 30^0 TSS and was also found to be richer in carbohydrate, fiber and ascorbic acid than the control. Hence, the standardized Prickly pear fruit squash is acceptable and can be consumed by the general population to increase their diet with potential antioxidants.

Keywords: Prickly Pear Fruit, Squash, Fiber, Vitamin C

INTRODUCTION

Natural products and healthy foods have recently received much attention from both health professionals and the common population for improving the overall wellbeing. Fruits are the

perfect candidates for the production of health-promoting foods and food supplements. The cactus pear fruit derived from the Cactaceae belongs to one of the most morphologically distinct and impressive plant families. Prickly pear fruit is harvested from various species of the prickly pear cactus, Genus Opuntia, of the cactus family (Cactaceae). The fruit is also called cactus pears or cactus fruit, although these names can result in confusion with fruits from other cactus species. The fruit is a berry, typically weighs about 100 to 200g (0.2 to 0.4 lb), and consists of a thick fleshy skin or rind surrounding a juicy pulp that contains many hard coated seeds. Fruits may vary considerably in colour, size and flavor and abundantly found in Mexico and the United States, and also grown in Africa, Madagascar, Australia, Sri Lanka and India (Piga, 2004). The fairly high sugar and acid content of the fruit gives it a sweet acidic taste. Cactus fruits are usually consumed fresh (Saenz, 2000) and has acidic flavor taste, succulent texture and long lasting permanence on the plant, the fruit is available mostly throughout the year.

The cactus pear fruit is considered as a functional food, and this feature has been attributed to its potential bioactive compounds such as Vitamine C, Vitamine E, Polyphenols, Carotenoids, Flavonoid compounds, Taurine and pigments (Fernandez- Lopez *et al.,* 2010). The pigments have shown beneficial effects on the redox-regulated pathways involved in cell growth and inflammation and have not shown toxic effects in humans (Castellar *et al.,* 2003). Prickly pear fruit has long been known in traditional medicine for treating a number of pathologies such as ulcers, dyspnea and glaucoma, as well as liver conditions such as wounds and fatique (Livrea and Tesoriere, 2004). Intake of prickly pear fruit may lead to significant reductions in total and LDL cholesterol levels (Uebelhack *et al.,* 2014). The fiber in prickly pear cactus plants may aid weight loss by binding to dietary fat, increasing its excretion and reducing energy absorption (Gouws *et al.,* 2020). Antioxidant compounds in prickly pear helps to protect against inflammation and oxidative stress that can damage the liver (El-Mostafa *et al.,* 2014 and Guillermo *et al.,* 2023). Though this fruit having potential bioactive compounds, they are mostly discarded in cultivated land itself and underutilized in most of the areas, hence the present study is aimed to prepare a healthy drink using the fresh prickly pear fruit pulp for the development and standardization of Prickly pear fruit squash and to analyse physico-chemical properties of selected standardized Prickly pear fruit Squash which can be easily made affordable to all set of people.

METHODOLOGY

Freshly harvested prickly pear fruits were purchased from the cultivated area of Varalotti village, a part of the dry land in Virudhunagar

District. Ripened prickly pear fruits were washed and peeled manually to discard the blemishes. The fruits were cut into even size and were processed in a mechanical pulper to obtain the pulp. It was filtered to separate the solids from the juice. A known quantity, 100 gms of Prickly pear fruit pulp was taken and sugar syrup was prepared by adding water, sugar and citric acid as per the quantity given in the table 1. The prepared syrup was immediately cooled down and added prickly pear fruit pulp into it. Finally 0.5gm of sodium benzoate was addedd as preservative to preserve the squash. It was stored in the sterilized bottles and kept it in refrigerator. The table-1 shows the ingredients used for the preparation of squash. In this study, sample A, B, and C were prepared by using 1:0.5, 1:1 and 1:1.5 of prickly pear fruit pulp and sugar respectively. Control was prepared as per the standard squash recipe including watermelon.

Table-1 : Ingredients used for the development of squash using Prickly Pear fruit.

Ingredients (g)	Control	Sample		
		A	B	C
Prickly pear fruit pulp	---	100	100	100
Watermelon	100	---	---	---
Sugar	75	75	100	125
Citric acid	1	1	1	1
Sodium Benzoate	0.5	0.5	0.5	0.5
Water(ml)	150	150ml	150ml	150ml

Physico-Chemical Parameters Analysis of Selected Standardized Squash by Using Prickly Pear Fruit

The parameters such as moisture content, total soluble solids and pH in all the three samples (Sample A, B and C) were determined as per the procedure of AOAC (2005) methods. The determination of water content in foods depends upon the loss of weight on heating. In this study moisture content was determined for the selected value-added products by using standard hot air oven method. The carbohydrate content of the sample was determined by using Benedict's Method. Crude fiber means variable amounts of cellulose and lignin in the sample. Crude fiber is determined by sequential extraction of the sample with 1.25% of sulphuric acid and 1.25% sodium hydroxide. Vitamin C content in the sample was estimated titrimetrically by the method of AOAC (2005).

EVALUATION OF SENSORY ATTRIBUTES

New product development requires the integration of sensory attributes including product's colour, flavour, texture, taste and appearance with consumer attributes and health biases. The sensory characteristics of control and prepared squash were subjected to sensory evaluation by 10 panel members using 5 point Hedonic Rating Scale.

RESULT AND DISCUSSION

In the present study, the mean scores for the squash developed by using prickly pear fruit pulp and sugar in the ratios of 1:0.5, 1:1 and 1:1.5 were statistically analyzed. It was presented in the table-2. Table-2 depicts the mean scores for colour, flavor, texture, taste and overall acceptability of squash prepared by using prickly pear fruit. In this analysis, it was found that sample A got more score **(4.8 ±0.4)** than the sample B (3.3 ±0.3), control (3.1± 0.6), and sample C (2.3 ±0.5). So that sample A was subjected to nutrient analysis.

Table-2: Mean score obtained in the Sensory Evaluation of Value Added Squash

Sensory Attributes	Control	Sample		
		A	B	C
Colour	2.9±0.6	**4.3± 0.6**	2.8± 0.6	3.7± 0.4
Flavour	3±0.5	**4.1 ±0.5**	2.7 ±0.4	2.5± 0.5
Texture	3.3± 0.6	**4.1± 0.4**	2.9 ±0.6	2.2 ±0.4
Taste	3.5 ±0.4	**4.5± 0.4**	2.9± 0.4	2.2 ±0.3
Overall Acceptability	3.1± 0.6	**4.8 ±0.4**	3.3 ±0.3	2.3 ±0.5

The product's physical characteristics, such as taste, colour, flavour and texture, are helpful for processing and storing. It also serves as key factors in determining the product's grade and cost as per the report of Mohammed *et al*., (2014). All the respondents preferred the squash (sample A) in respect of the selected parameters such as taste, colour, flavour and texture. The moisture, pH and TSS of prickly pear standardized squash was 82.06%, 5.4 pH and 30^0 respectively. Similar results were found by Somaris (2018) who recorded small difference due to variety, maturity indices and other physiological factors.

The carbohydrate content of the standardized squash and control was 30.02grams and 15.62grams. The result depicts that the value added products had more carbohydrate content than the control. Vitamin C contributes to the antioxidant properties of the prickly pear juice, which play important roles in maintaining the health of the immune and nervous systems, skin, heart, and more. Ascorbic acid content of the squash and control were found to be 48.36mg and 35.63mg respectively. This result revealed that Ascorbic acid content was more than the control in sample A. The obtained values in the present are higher compared to Gurrieri *et al.,* (2000) who recorded the range in between 31–38 mg in prickly pear juice.

Prickly pear cactus is a fiber packed fruit. The Fiber content of the squash and control were found to be 4.68g and 1.08g respectively. This result revealed that Fiber content was more in sample A than the control. Considering the chemical components of the prickly pear cactus, its nutritional attribute is relatively modest and this fruit can be used as a dietary complement. Sample A (1:0.5) got a higher mean score than the other sample. They are good source of fiber and

ascorbic acid. Therefore, the potential uses of prickly pear fruits can be used in different industries as promising candidates in future. The selected standardized prickly pear fruit squash was highly acceptable and can be consumed by general population to increase their antioxidant level in their diet.

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