

DEVELOPMENT AND QUALITY EVALUATION OF VEGETABLE JUICE BLEND WITH COCONUT MILK

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Abstract

Many studies show that organic food as vegetables, fruits and preserves contained more dry matter, C and B group vitamins, total sugar, indispensable amino acids, and minerals, at the same time organic plant foods usually have been in general better evaluated in terms of taste and smell than conventional ones. The objective of this study was to develop carrot and beetroot juice blended with coconut milk. Analysis of the products was carried out in the laboratory in terms of different Physico-chemical parameter, It was observed that the developed blended juice was enriched with nutrient like vitamin C, Vitamin A and total sugar. The shelf-life of the developed blended juice was 15 days when stored at 4 °C temperature in terms of microbial activity. So the aim was to develop a blended juice with high nutrient in different property and to maintain the quality of that juice to make it consumer acceptable and also give them the health benefit required.

Index Terms- blending, juice, Physico-chemical, preserve.

1. INTRODUCTION

Juices are a good source of sugars, vitamins and minerals; all valuable components to human health. The current food trend toward healthier diets makes juice consumption an important natural food alternative and improves the availability of its nutritive compounds.

A growing risk of lifestyle diseases, e.g. hypertension, atherosclerosis, obesity, diabetes, and most of all cancers, stimulate the society to take steps towards rational nutrition with high-quality products. Informed consumers are more often looking for organic food, the production process of which guarantees high quality, which is confirmed by corresponding certificates.

One can see the growing popularity of blended juice as a source of betalains, phenolic acids, flavonoids and other antioxidants vital in health prevention (Young and Sun 2005). Carrot is believed to have originated in Afghanistan which remains the center of diversity of *D. carota*.

Beetroot is an excellent source of folate and a good source of manganese, and contains betaines which may function to reduce the concentration of homocysteine, a homolog of the naturally occurring amino acid cysteine. High circulating levels of homocysteine may be harmful to blood vessels and thus contribute to the development of heart disease, stroke, or peripheral vascular disease.

Coconut milk, not to be confused with coconut water, is obtained primarily by extracting juice by pressing the grated coconut white kernel or by passing hot water or milk through grated coconut, which extracts the oil and aromatic compounds. Coconut milk is the liquid that comes from the grated meat of a brown coconut. The color and

rich taste of coconut milk can be attributed to the high oil content. Most of the fat is saturated fat.

Product development has always been at the heart of food industry and rapid technological changes, accompanied by a steady increase in the standard of living, resulted in even greater opportunities for product development (Earle 1997). At the present time, several fruit juice blends are available in the market. Functional properties of food vitamins and minerals are essential factors to consider in the formulation of new food products. (Yu *et al.* 2007).

During the last years, carrot and beetroot beverages consumption has gradually increased due to their significant concentration of health-promoting compounds, such as isoflavones. Epidemiological and clinical studies suggest that consumption of a diet rich in isoflavones is associated with low risk of the so-called Western diseases, such as coronary heart disease, osteoporosis, menopausal symptoms, hormone-dependent cancers, obesity, and diabetes. Carrot and beetroot are tuberous vegetable which are full with vitamin A, vitamin C and important trace minerals. Consumption of beetroot, carrot is highly beneficial to gastro intestinal disease. It is also helpful for people with cardiovascular problems because it has no cholesterol (Anderson *et al.* 1997). The objective of this study was to (1) to develop carrot, beetroot juice blended with coconut milk, (2) to determine the Physico-chemical properties of developed blended juice and (3) to study the shelf-life of developed blended juice.

2. MATERIALS AND METHODS

The present investigation entitled —Development and Quality Evaluation of vegetable juice blend with coconut milk was carried out in the Department of Food Process Engineering, Vaugh School of Agricultural Engineering and

Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad

Table 2.1 Project Work plan for formulation of Product combinations

Sample	% Carrot juice	% Beetroot juice	% coconut milk
T0	100	00	00
T1	70	10	20
T2	70	05	25

2.1 Material Required

The materials such as Carrot, Beetroot, Coconut and sugar were procured from nearby local market in the month of March and Care should be taken to ensure that good quality and yeast mold-free samples are selected.

2.2 Processing of beverage

The final beverage was processed using three different proportions/blends (100:00:00, 70:10:20 and 70:05:25) of carrot juice, beetroot juice, and coconut milk respectively. The mixture was heated to 75 °C, for 15 sec by added citric acid to prevent from clotting (Jain 1990). It was homogenized in a laboratory homogenizer and pasteurized followed by cooling (to about 35°C). The beverage was then filled into sterilized, labeled 250 ml glass bottles and stored at 4 °C.

3. ANALYTICAL METHODS.

3.1 Proximate analysis

The T.S.S was measured using a hand Refractometer, the pH was measured using a digital pH meter. The Titrable acidity and Ascorbic acid content was measured according to the AOAC method. Determination of Reducing and non-reducing sugar was done according to the method mentioned in S.Rangana.(Handbook of Analysis and Quality Control for Fruit and Vegetable)

3.2 Microbial analysis

The microbial count of the blended juice was estimated by the Total Plate Count method using nutrient agar media and for the estimation of yeast and mold count the similar method was repeated using potato dextrose agar media as given in K.R Aneja (Experiments in Microbiology Plant Pathology and Biotechnology)

3.3 Sensory quality evaluation

The samples of the blended juice were evaluated as described by (Luckowet al., 2006) for their sensory characteristics namely color and appearance, taste, aroma and overall acceptability by panel consisting of 10 panelists drawn from staff members and post graduate students of the Department. The panelists were asked to record their observations on the sensory sheet based on a 9 point hedonic scale (9 and 1 points showing like extremely and dislike extremely).

4. RESULT AND DISCUSSION

4.1 Developed blended juice

It was observed that the highest Physico-chemical analysis was obtained with maximum incorporation of 70% carrot juice in the juice blend. Therefore, the ingredient compositions having 70% carrot juice, 10% beet-root juice and 20% of orange juice was selected as optimum and used for storage study.

4.2 Physico-chemical parameters of the developed beverage

4.2.1 Effect of storage period on TSS.

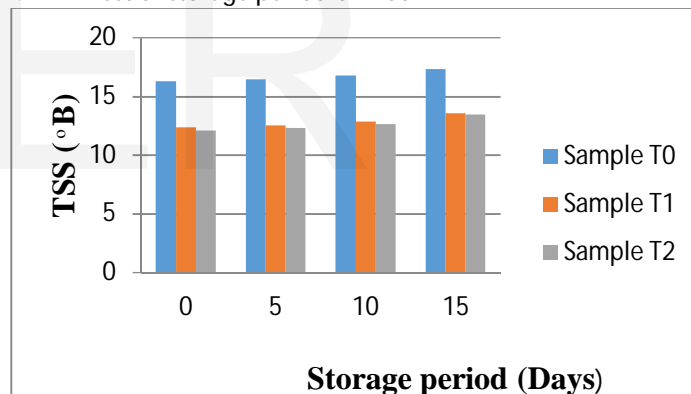


Fig. 4.1 Effect of storage period on TSS of developed blended juice

4.2.2 Effect of storage period on Vitamin C content

The ascorbic acid (vitamin 'C') content of the juice decreased during storage with the advancement of storage period, which was probably due to the fact that ascorbic acid being sensitive to oxygen, light and heat was easily oxidized in presence of oxygen by both enzymatic and non-enzymatic catalyst. The juice was better in ascorbic acid content but rate of decrease was very slow with coconut milk blend because coconut milk might have reduced the oxidation process. Hence, when beetroot and carrot juice was blended with coconut milk for the preparation of ready-to-serve blended juice, it boosted their nutritional quality in terms of vitamin 'Content'.

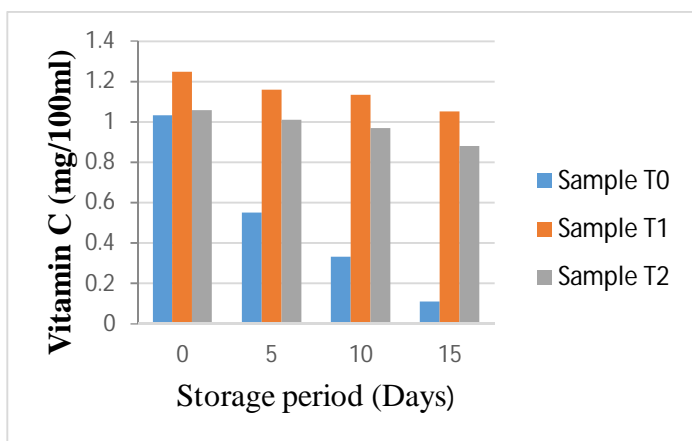


Fig. 4.2 Effect of storage period on Vitamin C content of the blended juice.

4.2.3 Effect on Titrable acidity % during storage period

There was a significant increase in Titrable acidity content during storage. This might be due to the addition of citric acid and increase in the level of fermentation. It was observed that maximum acidity (1.70%) was recorded in the prepared juice.

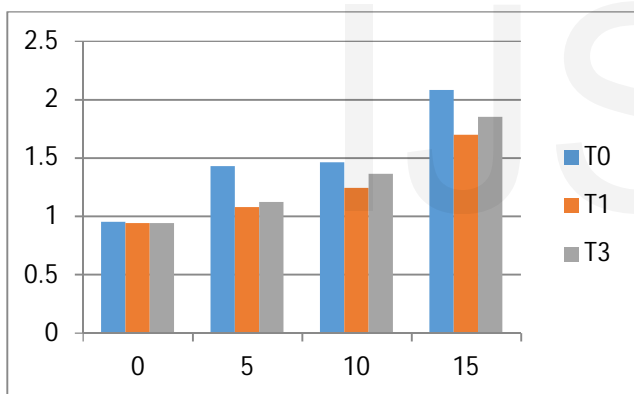


Fig.4.3 Effect of Titrable acidity % on storage period

4.2.4 Sensory evaluation of Organoleptic attributes.

Three samples of blended juice was prepared by a combination of carrot, beetroot and coconut milk was prepared and produced to a group of panelist and result was obtained on a 9- point hedonic scale where 9 point indicates Like extremely, 8- Like very much, 7- Like moderately 6- Like slightly 5- Neither like nor dislike 4- Dislike slightly 3- Dislike moderately 2- Dislike very much 1- Dislike extremely. According to the analysis by the panelist the sample T0 could be rated the best sample in terms of its organoleptic attributes.

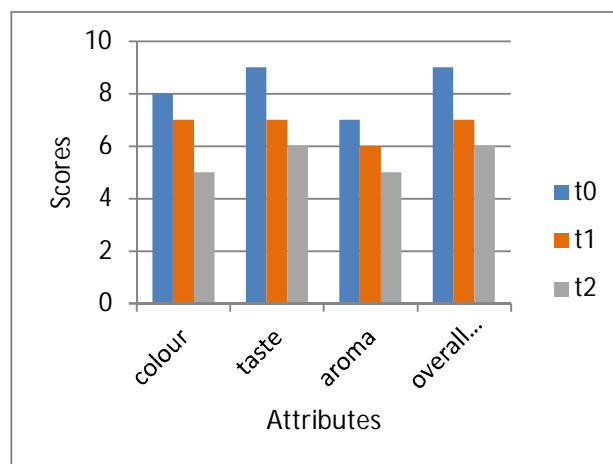


Fig 4.4 Organoleptic properties of three samples of blended juice.

5. CONCLUSION

The blended juice was prepared with a purpose of providing energy and important nutrients to every age group. This can be consumed anytime with addition of sugar for taste. The blended juice is a very good source for those who suffer from lactose anemia and stomach problem.

Physico-chemical parameters such as Titrable acidity, ascorbic acid, beta carotene, were evaluated. Sensory attributes such as color, aroma, taste, and overall acceptability were correlated among different samples. Sample T0 was highly acceptable in taste, color, texture, overall acceptability as compared to other samples. The microbiological test (bacterial count), conducted to estimate the shelf life of the carrot, beetroot and coconut milk blended juice samples, showed that the samples if kept at refrigerated temperatures were safe for consumption for 15 days, but we can prolong its shelf life by keeping it at much lower temperature.

Table 5.1 Overall quality parameters of developed blended juice

Constituents	Sample T1	Sample T2	Sample T0
TSS (°Brix)	12.34	12.11	16.25
Titration Acidity (%)	0.2881	0.2881	0.1687
Citric acid			
Ascorbic acid (Vitamin C) mg/100ml	1.248	1.058	1.032
Total sugar	6.878	6.546	5.973
Ph.	6.5	6.3	6.3

By evaluating the Physico-chemical properties of blended juice it can be concluded there was changes during the storage period and storage condition. By the observation method of total plate count it can be concluded that the shelf life of prepared juice was 15 days when stored at 4 °C. Study reveals that coconut milk could be used in decreasing the beany flavor thus promoting acceptability of beverage. This could be beneficial to communities where carrot and beetroot juices are unacceptable, unavailable or unaffordable or intolerance.

6. REFERENCES

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