



ORIGINAL RESEARCH PAPER

Home Science

FORMULATION AND NUTRITIONAL EVALUATION OF TENDER COCONUT-CARROT SMOOTHIE

KEY WORDS: smoothie, tender coconut, carrot, nutritive analysis

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ABSTRACT

Smoothies are popular dietary products. Vegetable smoothies are an increasingly popular wellness trend and frequently marketed as a health food. The present study was aimed to develop a smoothie with tender coconut and carrot. Fresh tender coconut and water, good quality carrot and natural honey were the ingredients used to develop smoothie. The tender coconut and carrot pulp were mixed under three variations for 100ml each as V1 (50:50), V2 (60:40) and V3 (70:30) respectively. The developed product underwent nutritive analysis and consumer acceptance. Results indicate that variation 1 scored high in all their attributes. It was revealed that the 100ml of tender coconut-carrot smoothie has energy 78.28 kcal, protein 0.98, fibre 2.9, potassium 170mg, vitamin A 320mcg and Vitamin C 4.7mg. The tender coconut smoothie with carrot obtained high score when compared with the commercially available flavored fruit juice. The developed tender coconut-carrot smoothie was a convenient food which increases the vegetable intake to be healthy and to increase nutrient intake due to their natural ingredients.

INTRODUCTION

Smoothies are typically made by blending whole fruits and vegetables which preserves fibre whilst juicing tends to leave behind a pulp containing fibre but otherwise retains its nutritional value. Changing lifestyles, meal skipping and their portability being seen as healthier snacking options all appear to be major drivers behind market growth (Clemens et al., 2015). Smoothies with improved sensory characteristics were developed by blending selected tropical Indian fruit pulps/juices. Fruit pulps from mango, papaya, sapota, banana, juices from green grapes and pineapple etc. Fruits are excellent sources of phyto chemicals which are essential for human health and relished by consumers in all seasons (Ahmed, 2008).

An attempt was made by Khan et al (2021) to develop herbal smoothie by using carrot, cucumber, strawberry and Shankpushpi (herb) with different compositions and optimize on the basis of sensory analysis. The results showed that the moisture content and ash content of the carrot, cucumber, strawberry and Shankpushpi herb were calculated as 89.95%, 96.45%, 93.17%, 4.73% respectively were 3.33%, 6.3%, 1.65%, 13.1% respectively. The Titrable acidity of carrot, cucumber, strawberry, control and sample with 1.25g Shankpushpi herb were 0.12%, 0.12%, 0.17%, 0.17%, 0.213% respectively. The pH of carrot, cucumber, strawberry, control and sample with 1.25g Shankpushpi herb were 5.69, 5.05, 3.40, 3.83, and 3.92 respectively. The TSS of carrot, cucumber, strawberry, control and sample with 1.25g Shankpushpi herb were 4°brix, 2°brix, 6°brix, 5°brix, 18°brix respectively. Storage of control and sample was done at room temperature as well as at 3°- 5°C.

Tender coconut is found to be one of the value added by products from coconut with vast commercial potential. It is nutritious, natural, medicinal, mineral drink with well acceptable flavour and taste and consumed by all age groups (Balaswamy et al., 2011). Tender coconut is rich nutritious, presenting low fat levels and considered to be a good isotonic drink. It is also rich in proteins, amino acids, sugars, vitamins, minerals and growth factors. It is not only a thirst quenching but also a mineral drink that helps to cure many diseases. Tender coconut contains full range of B vitamins, except B6 and B12. It is the rich source of magnesium, potassium and vitamin C which are known to reduce of coronary heart disease. It the major source of free amino acid L-arginine, which has vasodilator function.

Like many other coloured vegetables carrot is a gold mine of

antioxidants. Carotenoids, poly phenols and vitamins present in carrot act as antioxidants, anticarcinogens and immune enhancers. Carotenoids widely distributed in orange carrots are potent antioxidants which can neutralize the effect of free radicals (Dias, 2012). They have been shown to have inhibition mutagenesis activity contributing to decrease risk of some cancers. Zaini et al (2011) reported the anti-carcinogenic effect of carrot juice extracts on myeloid and lymphoid leukaemia cell lines. Hence the development of nutritionally value added product could help on improving the health of consumers. Based on this phenomenon the present study was undertaken to develop a smoothie with tender coconut and carrot.

Methodology

Fresh tender coconut and water, good quality carrot and natural honey were the ingredients used to develop smoothie. Figure-1 illustrates the steps involved in development of tender coconut-carrot smoothie. The tender coconut and carrot pulp were mixed under three variations for 100ml each as V1 (50:50), V2 (60:40) and V3 (70:30) respectively.

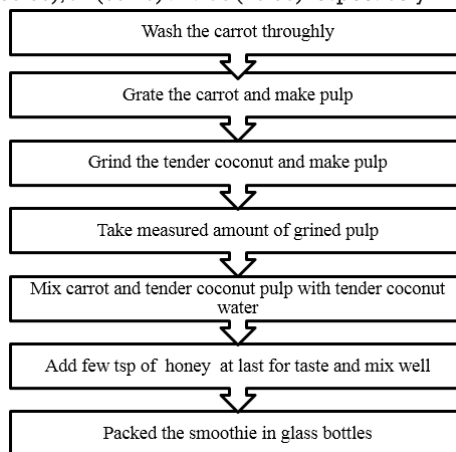


Figure 1: Steps for development of tender coconut-carrot smoothie

Organoleptic evaluation: The formulated tender coconut smoothie with carrot was subjected to organoleptic evaluation for its quality attributes like flavour, appearance, taste, texture, overall acceptability. Using five point rating hedonic scale 25 semi trained panel members selected the acceptability of the product.

Physicochemical properties: The highly scored variation of tender coconut smoothie with carrot was subjected to physiochemical analysis to test the moisture and ash and they were analysed using standard procedure AOAC method.

Analysis of nutrients: The highly scored variation of tender coconut-carrot smoothie was subjected to nutrient analysis which include energy, carbohydrate, protein, fat, fibre, potassium and vitamin C by using standard procedure of AOAC method.

Microbial analysis: To determine the storage stability, the highly scored variation of tender coconut-carrot smoothie were subjected to microbial analysis and total bacterial count which was done for 6 hours to find the presence of bacteria ,yeast and mould as no preservatives were added.

Cost calculation, packaging and labelling: The cost of tender coconut-carrot smoothie were calculated based on the cost of raw ingredients. The tender coconut-carrot smoothie was bottled and sealed. Nutritional labelling was designed to provide necessary information like ingredients list, nutritional facts, manufactured date, cost price, storage method and serving size.

RESULTS AND DISCUSSION

The results pertaining to study were discussed as organoleptic evaluation, physio-chemical properties, nutritional analysis, storage stability, cost calculation and packaging.

Organoleptic evaluation of the tender coconut-carrot smoothie

Organoleptic evaluation of the tender coconut-carrot smoothie was done by using five points hedonic scale. The mean values scores for appearance, colour, flavour, texture, taste, overall acceptability are presented in the below table. The results of the organoleptic scoring of three variations of the tender coconut smoothie is depicted in table-1

Table 1 Mean sensory score for tender coconut smoothie with carrot

S.No	Parameters	Variation-1	Variation-2	Variation-3
1	Appearance	4.96±0.02	4.88 ± 0.3	4.08 ±0.49
2	Colour	4.92 ± 0.27	4.72 ± 0.54	3.88 ± 0.5
3	Flavour	4.96 ± 0.2	4.52 ± 0.5	4.4 ± 0.76
4	Texture	4.92 ± 0.27	4.8 ± 0.4	4.8 ± 0.4
5	Taste	4.9 ± 0.8	4.48 ± 0.5	3.88 ± 0.6
6	Overall Acceptance	4.96±0.8	4.52 ± 0.5	3.28 ± 0.4

The above table indicates the average sensory scoring and standard mean deviation of different attributes and overall acceptability of three variations of tender coconut smoothie with carrot. As evident from the table, variation-I was given high scores in all their attributes.

Phytochemical, nutrient and microbial analysis

The analyzed Ash and moisture percentage of the developed tender coconut smoothie with carrot were 0.54% and 75.4% respectively. The proximate principle includes the nutrients like energy, carbohydrates, protein, fat, fiber, potassium and vitamin C and these nutrients were analyzed.

Table 2 Nutritive analysis of tender coconut smoothie with carrot

S.No	Parameters	Tender coconut - carrot smoothie	Commercial flavored juice
1	Energy (Kcal)	78.28	65
2	Carbohydrates (g)	17.81	16.2
3	Fat (g)	0.51	0.2
4	Protein (g)	0.98	0.1
5	Fibre (g)	2.9	0.1

6	Potassium (mg)	170	-
7	Vitamin C (mg)	4.7	0.8
8	Vitamin A (mcg)	320	120

The above table proved that the nutrients in the formulated smoothie were high when compared with a locally available commercial fruit drink. The stability of the product was done by microbial analysis. The total microbial count was analyzed and it was found that no bacterial growth for 6 hours without any added preservatives.

Costing, Labeling and packaging: The production cost of the tender coconut-carrot smoothie was Rs.25 per 100 ml which were based on the ingredients used and preparation methods. The cost calculated was acceptable by both seller and customer. Packaging can promote the shelf life of food products .The prepared and formulated sample of tender coconut smoothie with carrot were bottled and sealed. Labeling is used to display identification of brand, product and nutrient details. Labeling was done by polyethylene sheets.

Consumer acceptance: The highly scored variation (V1) of tender coconut smoothie with carrot was assessed for consumer acceptance through sensory valuation by 30 consumers (residents at karuvalur, Avinashi) compared with the commercially available flavored fruit juice. The consumer acceptance of the tender coconut smoothie with carrot was calculated by using five point hedonic scale and were presented in the below figure-3. From the graphical representation it is clear that the sample(tender coconut smoothie with carrot) obtained high score when compared with the control (commercially available flavored fruit juice).

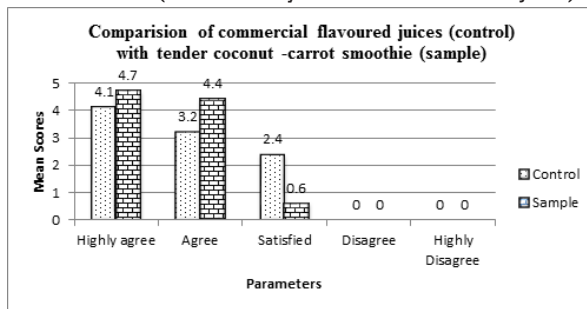


Figure 2 Consumer acceptance of tender coconut-carrot smoothie

CONCLUSION

Smoothies are popular dietary products with the potential to assist individuals in incorporating more fruit and vegetables into their diets. Tender coconut- carrot smoothie plays a positive role in the diet. The majority of smoothie consumers reported the taste as a reason for consumption. The developed tender coconut-carrot smoothie was a convenient food which increases the vegetable intake to be healthy and to increase nutrient intake due to their natural ingredients. Smoothies can be considered a tooth-friendly beverage when consumed in moderation. Nutritious smoothies are made with whole foods like fruits, vegetables, greens, yogurt, and healthy fats, while those with lots of added sugars are not considered as nutrient dense as it will contribute to negative health effects over time. Smoothies high in protein and fiber will support for weight loss as it increases the satiety value.

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