

RESEARCH PAPER

Nutritional analysis of Guava (*Psidium guajava* L.) and its incorporation in Bhakarwadi

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ABSTRACT

Guava fruit is a highly nutritious fruit which is widely grown all over the world and it is very commonly consumed in India. It contains many nutritional as well as medicinal properties that play an important role in human body. It also plays anti-diabetic, anti-ulcerative, anti-fungal, antidiarrheic, antihypertension antiobesity, anticancer, anti-inflammatory, antispasmodic role. Also, many parts of guava plant contain various health benefiting properties. This study aimed to analysis the nutritional status of guava fruit and incorporated it in food product for its enrichment and sees the acceptability be conducting sensory evaluation. The results showed that it contain 56.42 mg/g moisture, 6.9mg/g ash, 43.58 mg/g carbohydrates, 9.20 mg/g protein, 256.42 µg/g fat, 0.552 mg/g sodium, 1598 µg/g calcium, 185 µg/g magnesium and 1.30 mg/g potassium. The food product enriched was bhakarwadi and total four samples including one standard and three variants were gone through sensory evaluation and sample A was the most accepted sample. This bhakarwadi can be used as healthy and nutritious form of snack in daily routine.

Keywords: Guava fruit, Nutrition analysis, Bhakarwadi, Sensory evaluation

Guava (*Psidium guajava* L.) plant belongs to Myrtaceae family. It is one of the important tropical and subtropical fruit crop in the world as it can be grown in different soils and climate conditions and has high nutritional profile. India holds first position worldwide in the cultivation of guava and Uttar Pradesh, Madhya Pradesh, Maharashtra and Bihar are some important states of growing guava in country and from which Allahabad district of Uttar Pradesh is famous for growing excellent quality of guava fruit in the world (Jolhe P *et al.* 2020). This plant plays an important role in ancient medicine and helps in preventing and treating various diseases. It is believed that many parts of this plant are useful in treating diseases like diarrhea, malaria, ulcers, vomiting, cough, gastroenteritis, dysentery, obesity, diabetes, hypertension etc. (Shaheena *et al.* 2019) (Biswas *et al.*

2013). Guava fruit is considered to be rich source of vitamins and minerals like ascorbic acid, vitamin A, pantothenic acid, iron, calcium and phosphorus. It is considered to a better source of vitamin C than apple and pear. Also, it is four times richer in vitamin C if compared with orange. It is also known as "apple of poor" (Muhammad *et al.* 2010). They are also a good source of phytochemical compounds like flavonoids, alkaloids which helps in showing positive impact on health. This can be used in various ways for getting its healthy effects (Seshadri VD *et al.* 2020) (Laily N *et al.* 2015). The aim of this study is to analyses the biochemical parameters of guava fruit and to develop

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the food product by incorporating guava fruit powder in different ratios and conduct its sensory evaluation.

MATERIALS AND METHODS

Collection of sample: The Allahabad Safeda variety of guava fruit was collected from the Krishi Vigyan Kendra of Banasthali Vidyapith, Newai, Rajasthan, India.

Preparation of sample: The mature samples of guava fruit was properly washed with water for the removal of impurities. The fruit was cut into the small pieces and were dried in hot air oven at 80° for 15 hours. Then the dried pieces of guava were grinded in a mixer for a fine powder and then filtered through a muslin cloth. Then, the powder was stored for the further use.

Nutritional analysis of sample: The prepared samples was used for the nutritional analysis. Moisture content was determined using Air-oven method, ash using Muffle furnace method, protein using Micro-Kjeldahl method, fat using Soxhlet apparatus, carbohydrates using calculation by difference (Raghuramulu N *et al.* 2003) (AOAC, 1995). The minerals sodium, potassium, calcium and magnesium analysis was done with Atomic absorption spectrophotometer (NIN, 2003).

Development of food product: The food product was developed using the dried guava fruit powder.

The food product prepared was Bhakarwadi. For preparing bhakarwadi, the ingredients were collected from the market of Banasthali Vidyapith, Newai, Rajasthan, India. In total 4 samples of bhakarwadi were prepared, out of which one the standard with no changes and other three were prepared by incorporating the dried guava fruit powder in different composition. The ingredients and the amount used for preparation of samples of bhakarwadi are given in Table 1.

The bhakarwadi was prepared by using the following method:

Step 1: The flours and the dried guava fruit powder were mixed together and dough was prepared by kneading it and kept aside by covering it for at least 30 minutes at room temperature.

Step 2: The stuffing was prepared by mixing the spices and dried coconut powder together and grinding into a fine powder.

Step 3: The dough prepared was flatten using a rolling pin.

Step 4: The tamarind chutney was spread over the flatten dough and the stuffing was spread all over it.

Step 5: The bhakarwadi spirals were made by rolling the assembled dough and stuffing and cutting it into the equal pieces.

Table 1: Composition of bhakarwadi prepared by using guava fruit powder

Ingredients	Amount (g)			
	Sample A	Sample B	Sample C	Sample D
Gram flour	30	30	30	30
All-purpose flour	20	20	20	20
Black gram dal	20	20	20	20
Rice	10	12	10	10
Sesame seeds	2	2	2	2
Oil	10	10	10	10
Red chilli powder	A pinch	A pinch	A pinch	A pinch
Salt	A pinch	A pinch	A pinch	A pinch
Asafoetida	A pinch	A pinch	A pinch	A pinch
Dried guava fruit powder	Not incorporated	10	7	4

Step 6: The spirals were fried in oil and served / presented.

Sensory evaluation of developed food product: The attributes used for sensory evaluation were color, taste, texture, odour and overall acceptability. The evaluation was done using the 9 point hedonic scale. The 15 panelists were selected from the Department of Food Science and Nutrition, Banasthali Vidyapith. In this scale, the panelist tastes the food samples and rate them from 1 to 9 according their senses. The 9 score denotes like extremely while 1 denotes dislike extremely.

Statistical analysis: The results were expressed in the form of mean \pm standard deviation (SD).

RESULTS

Nutritional analysis of sample: The analyses of different parameters are shown in Table 2 in the form of mean \pm standard deviation.

Prepared food product: The developed food product i.e., bhakarwadi with different proportions of incorporated guava fruit powder is shown in Fig. 1.

Table 2: Nutritional analysis of guava fruit powder

Sl. No.	Nutrients	Values
1	Moisture (mg/g)	56.42 \pm 0.11
2	Ash (mg/g)	6.9 \pm 0.06
3	Carbohydrates (mg/g)	43.58 \pm 1.20
4	Proteins (mg/g)	9.20 \pm 5.81
5	Fat (μ g/g)	256.42 \pm 20.21
6	Sodium (mg/g)	0.552 \pm 0.02
7	Calcium (μ g/g)	1598 \pm 0.05
8	Magnesium (μ g/g)	185 \pm 0.01
9	Potassium (mg/g)	1.30 \pm 0.02

The Sample A is the standard which has no incorporation of guava fruit while sample B has 10g of guava fruit powder incorporation, sample C has 7g and sample D has 4g.

Sensory evaluation: The panelist scored all the attributes of the sensory evaluation and according to that sample A was the most accepted in all the attributes. The results are shown in the form of mean \pm standard deviation in Table 3 and the average results are shown in the Fig. 2.



Fig. 1: Prepared food product enriched with guava fruit powder

Table 3: Mean \pm SD of sensory evaluation of developed food product

Samples	Sample A	Sample B	Sample C	Sample D
Color	7.75 \pm 0.85	8.05 \pm 0.94	7.5 \pm 1	7.75 \pm 0.96
Taste	7.25 \pm 0.91	8 \pm 0.91	7.55 \pm 0.99	7.05 \pm 0.94
Texture	7.45 \pm 1.09	7.6 \pm 1.04	7.5 \pm 0.94	7.4 \pm 0.99
Odour	7.15 \pm 0.93	7.7 \pm 0.92	7.55 \pm 0.94	7.55 \pm 0.94
Overall acceptability	7.65 \pm 0.81	8.05 \pm 0.68	7.8 \pm 0.61	7.45 \pm 0.75

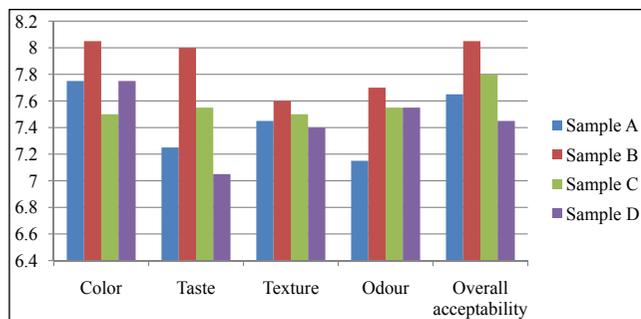


Fig. 2: Average sensory evaluation of developed food product

CONCLUSION

The present work shows the nutritional analysis of guava fruit and its incorporation in food product and conducting its sensory evaluation. The results of nutritional analyses shows that the guava fruit is a good source of nutrient. It contain good amount of minerals. The bhakarwadi as a food product was developed by enriching it with guava fruit powder and the sensory evaluation shows the acceptability of sample A which contain 10g of guava fruit powder in it.

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