Development and Quality Evaluation of Tea from Guava Leaves

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Abstract:- Guava plants are attractive and produce delicious, sweet fruits. The aim of the research study was to "Development and Quality Evaluation of Tea with Guava Leaves", Tea was prepared from guava leaves and evaluated its Sensory analysis, proximate analysis and micronutrient composition. To prepare guava leaf tea, both ripened and un-ripened leaves were collected, washed, and dried. The leaves were then boiled and added additional ingredients such as jaggery, cloves, ginger, and fennel seeds. The resulting tea was evaluated for sensory attributes including aroma, appearance, texture, taste, mouth feel, and overall acceptability with 5-point hedonic scale rating. Statistical analysis of the sensory data showed that Sample B ripened leaves generally received higher scores across all attributes compared to Sample A un-ripened leaves, indicating a potentially better sensory experience. The nutritional analysis of the tea revealed that it provided a moderate amount of energy (372.22 kcal/100g), protein (1.12 g/100g), fat (0.58 g/100g). Carbohydrates were the main component contributing 90.63 g/100g. The tea was also found to be a good source of calcium (18 g/100g) and vitamin C (228.3 mg/100g), essential for bone health and immune support. The microbial parameters analyzed, the Total Bacterial count and Coliform Count were within acceptable limits, and the presence of Escherichia coli (E. coli) was absent, which indicating satisfactory hygiene standards. Guava leaves are known for their medicinal properties and have been traditionally used for treating various health conditions. The major flavonoid found in guava leaves is quercetin, which exhibits numerous beneficial effects, including antiproliferative and antimicrobial activities.

Keywords:- Guava leaves, Herbal Tea, Sensory analysis, proximate analysis and microbial analysis.

I. INTRODUCTION

Guava (*Psidium guajava* L.) is a fruit native to the American tropics; it is also known as guayabo, guara, arrayana, and luma in some regions. It ranges from Mexico to Peru, but because of its adaptability, it is cultivated in tropical and subtropical zones of Europe, Africa, and Asia. This fruit was carried across the Pacific by the Spanish to the Philippines, and by the Portuguese to India, and it was rapidly adopted as a crop in Asia and some areas of Africa; it is now found in Egypt, Palestine, Algeria, and the French Mediterranean coast *(Angluo Lopez JE et al., 2021).* Guava leaves (*Psidiiguajavae folium*; GL) are dark green, elliptical, oval, and characterized by their obtuse-type apex. Guava leaves, along with the pulp and seeds, are used to treat certain respiratory and gastrointestinal disorders, and to increase platelets in patients suffering from dengue fever. GLs are also widely used for their antispasmodic, cough sedative, anti-inflammatory, antidiarrheic, antihypertension, anti-obesity, and antidiabetic properties. Studies on animal models have also established the role of GL isolates as potent antitumor, anticancer, and cytotoxic agents *(Manoj Kumar et al., 2021).*

Quercetin is one of the most abundant flavonoids found in guava leaf. It is able to relax intestinal smooth muscle and inhibit bowel contractions. Extract of Guava leaves showed antiproliferative activity in vitro tests using leukemia cells. Its activity was 4.37 times more than the activity of vincristine. Moreover, water extract of guava leaves was described to be effective against a number of microbial strains and anti-rotavirus activity *(NoerLaily et al., 2015).*

II. MATERIALS AND METHODS

A. Raw Materials

The raw materials selected for this study were Guava leaves (ripened and un-ripened leaves), fennel seeds, ginger, cloves, and jaggery were collected from the local market Hyderabad. And the study was performed at Capital Degree and PG College, Hyderabad-500055, Telangana.

B. Preparation of Tea with Guava Leaves

Both the ripened and un-ripened guava leaves were collected then the collected leaves were washed to remove any impurities. The washed leaves were pat dried to remove the excess and kept aside then water was kept on the stove for boiling when the water starts to boil, guava leaves along with jaggery, cloves, ginger and fennel seeds were added, then oil for 10 to 15minutes, Once done, serve the tea in small glasses.

C. Organoleptic Evaluation

The sensory evaluation was carried out for the prepared tea sample using a 5-point hedonic scale with panel of 20 judges considering 6 parameters such as aroma, color, consistency, taste, mouth feel, and overall acceptability.

D. Nutritional Evaluation

The nutritional evaluation of best selected sample was analyzed as follows:

Table 1: Nutritional qualities and methods of selected guava leaves tea

Nutritional qualities	Methods
Energy	FSSAI Manual, 2016
Protein	FSSAI Manual, 2016
Carbohydrates	FSSAI Manual, 2016
Total fats	FSSAI Manual, 2016
Ash	FSSAI Manual, 2016
Moisture	FSSAI Manual, 2016
Calcium	EDTA titration method
Vitamin C	Rekha et al., 2012

E. Microbiological Analysis

Microbial analysis such as total bacterial count, coliform count, E. coli was carried out after 7 days of study by procedure followed by FSSAI manual.

F. Statistical Analysis

Data obtained from sensory analysis is subjected to mean and standard deviation and it was statistically calculated by T-Test using a significance of 0.05.

III. RESULTS AND DISCUSSION

A. Organoleptic Evaluation

The organoleptic evaluation of two samples were performed in KPHB, Hyderabad-500058.

Table-2 shows the mean and standard deviation of the sensory scores for different parameters. In terms of aroma, Sample A has a mean value of 5.20 while Sample B has a mean value of 4. 22.. Regarding appearance, Sample A has a mean value of 2.87 with a standard deviation of 0.58, while Sample B has a mean value of 3.95. Further texture, Sample A has a mean value of 2.55, whereas Sample B has a mean value of 2.92. In terms of taste, Sample A has a mean value of 2.77 with a standard deviation of 0.63, while Sample B has a mean value of 4.35. For mouthfeel, Sample A has a mean value of 3.12, whereas Sample B has a mean value of 4.05. Finally, in terms of overall acceptability, Sample A has a mean value of 3.17, while Sample B has a mean value of 4.44. These measurements provide an assessment of the sensory attributes for both Sample A and Sample B. Sample B generally tends to have higher mean values across all attributes, indicating a potentially better sensory experience compared to Sample A. Chart-1 shows the calculated T-Test value of the means of the samples. It is observed that the obtained p-value (0.03) is lesser than the significant value (0.05). Which indicates that there was a significant difference between the two samples.

B. Nutritional Analysis of The Guava Leaves Tea

The nutritional analysis of the selected sample was shown in table-3 the selected sample had an energy of 372.22 Kcal/100g, protein 12g/100g, carbohydrates 90.63g/100g, total fats 0.58g/100g, moisture 6.90g/100g, ash 0.77g/100g, 18mg/100gcalcium and vitamin C228.3 mg/100g. According to Thomas *et al* (*2017)* in guava leaves were 16.60mg of calcium per 100g, and 103.3mg of vitamin C per 100g.

C. Microbiological Parameters of Dried Guava Leaves Tea After 7 Days Storage

As shown in Table 4, the first parameter listed is the Total Bacterial count, which is measured in Colony Forming Units per milliliter (CFU/ml). According to the FSSAI Manual, the acceptable limit for the Total Bacterial count is less than 100 CFU/ml.The second parameter is the Coliform Count, also measured in CFU/ml. The FSSAI Manual states that the Coliform Count should be less than 10 CFU/ml to meet the acceptable limit.The presence of Escherichia coli (E. coli), a specific bacterium commonly used as an indicator of fecal contamination. The FSSAI Manual specifies that E. coli should be absent in the sample to comply with the guidelines.

Table 2: mean and standard deviation of the different samples for sensory parameters

Parameter	Sample A (un-ripened leaves)	Sample B (ripened leaves)
Aroma	5.20±0.80	4.22±0.44
Color	2.87±0.58	3.95±0.48
Consistency	2.55±0.53	2.92±0.46
Taste	2.77±0.63	4.35±0.36
Mouth feel	3.12±0.58	4.05±0.49
Overall acceptability	3.17±0.54	4.44±0.44

Chart 1: Calculated value of T-Test for the means of the samples
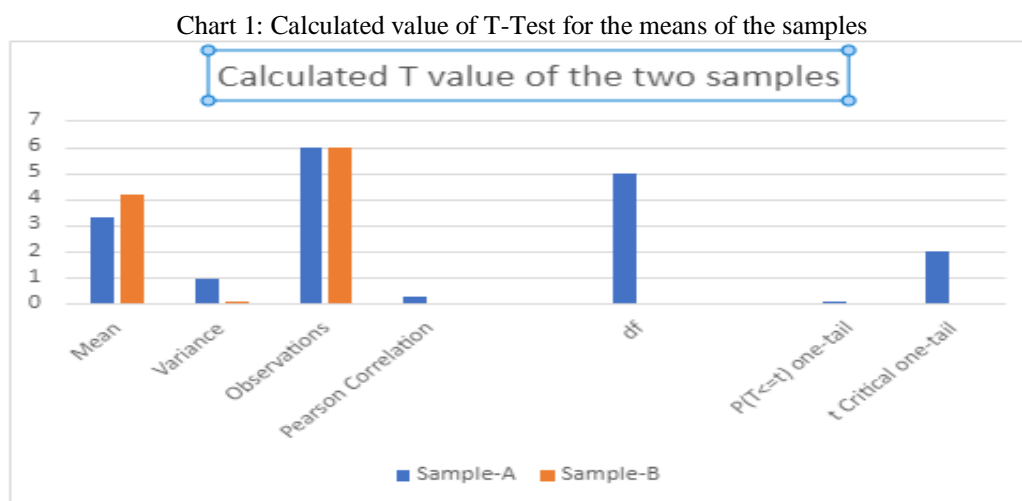
Table 3: Nutritive value of the selected guava leaves tea

TEST PARAMETER	RESULTS	UNIT
Energy	372.22	K.Cal
Protein	1.12	g/100g
Carbohydrates	90.63	g/100g
Total Fats	0.58	g/100g
Moisture	6.90	g/100g
Ash	0.77	g/100g
Calcium	18	mg/100g
Vitamin C	230	mg/100g

Table 4: Microbiological parameters of the selected dried guava leaves tea

TEST PARAMETER	UNIT	RESULTS
Total Bacterial count	CFU/ml	<100
Coliform count	CFU/ml	<10
Escherichia Coli	CFU/ml	Absent

IV. CONCLUSION

The selected guava leaves tea was highly acceptable in terms of organoleptic properties such as aroma, color, consistency, taste, mouthfeel, and overall acceptability. The selected guava leaves tea was found to be highly nutritious, and the selected sample was also found to be absent in microbiological parameters such as total bacterial count, coliform, and E. coli. Guava leaves control diabetes by controlling the blood sugar levels, increase good cholesterol and lower bad cholesterol. They also prevent heart attacks and stroke; therefore, guava leaves can be used to prepare tea due to its high phytochemical and vitamin-c activity.

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