



# Development and Evaluation of Guava Leaf Spiced Herbal Tisane Dips

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**Abstract**— Tisane is a generic term for tea made from herbs instead of leaves of tea plant. In recent times, tisanes are gaining increasing popularity among consumers because of new bioactive compounds and their health benefits. The present study aimed to develop and evaluate herbal tisane using guava, mint and tulasi leaves along with some spices. All the leaves were subjected to a series of pre treatments before development of tisane. The unblanched and solar dried leaves showed better color retention when rehydrated. Tisane dips were made weighing 1.7g each, in which control sample is unblanched guava leaves. Spice's mix contains 10% mint, 10% cinnamon, 20% basil and 10% ginger as constant. Sample treatments T1, T2, T3 and T4 respectively formulated using different compositions of guava leaves: spice mix like 40:60, 50:50, 60:40 and 70:30. Sample T4 (70:30) recorded higher amount of carbohydrate content (58.75%), protein content (22.15%), fat content (4.4%), total phenolic (150.1mg GAE/g), total tannin content (1.214mg CE/g) and was highly accepted by sensory panels. Based on the results it concludes that the formulation with 70:30 ratios of guava leaves and spice mix showed better results and can be best alternative to commercial tea with various health benefits.



**Keywords**— Guava leaf, Herbal, Spices, Tisane

## I. INTRODUCTION

Today there is increasing interest in discovering new bioactive compounds derived from ethnomedicine. Tisane, is a generic term for tea which is developed using herbs that can be served as a beverage [1]. These are gaining popularity among health-conscious consumers because of their fragrance, antioxidant properties and therapeutic applications [2]. Tisane can be made from the infusion or decoction of herbs, spices or any other plant material in hot water and they usually do not contain caffeine [3]. Phenolic compounds in guava leaves have been credited with regulating blood-glucose levels [4]. Newer tender leaves are particularly rich in fiber and roughage which is crucial for the prevention and treatment of constipation and hemorrhoids [5]. Guava contains good concentration of

quercetin which has been shown to exhibit incredible antibacterial activity against pathogens [6]. In recent times, there is renewed interest in functional beverage because of growing consumer awareness of health benefits derived from tea consumption. Tea therefore belongs to a rapidly expanding market of wellness beverage. Taking all these points into consideration the following research was taken up with the following objectives- To develop guava leaf-based tisane formulated with other herbs and spices and to evaluate of physicochemical and organoleptic properties of the guava leaf tisane dip extract.

## II. MATERIALS AND METHODOLOGY

Medium matured mid rib removed leaves were thoroughly

cleaned. All these spices were collected from the nearer markets in the area. i.e, Bapatla, Guntur Dist, Andhra Pradesh. Tea bags that are heat sealable, degradable and made of cellulose were used.

**2.1. Methodology:** Guava leaves were blanched using water ( $85\pm 1^\circ\text{C}$  for 2 mins ) and steam ( $90\pm 1^\circ\text{C}$  for 3mins). They were allowed to cool at the room temperature after

draining the water. Basil leaves were steam blanched, dried and pulverized. Mint leaves were dried without any pretreatments. All the leaves were sufficiently flattened in roller flaker in order to rupture and release the leaf components from the interstitial cells. This was followed by drying separately in cabinet drier ( $60\pm 5^\circ\text{C}$  for 5hrs) and solar drier. The dried leaves were pulverized (Fig 1)

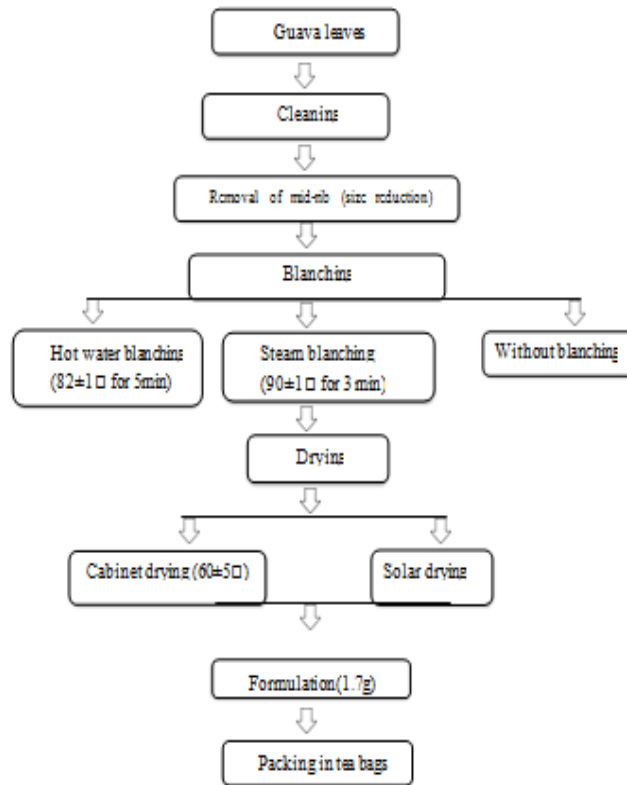


Fig 1: Flowchart of tisane dips preparation

Table 1: Formulation of tisanes

| Ingredients  | Control<br>100% | T <sub>1</sub><br>(40-60%) | T <sub>2</sub><br>(50-50%) | T <sub>3</sub><br>(60-40%) | T <sub>4</sub><br>(70-30%) |
|--------------|-----------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Guava leaves | 1.7             | 0.68g                      | 0.85g                      | 1.02g                      | 1.19g                      |
| Ginger       | -               | 0.17g                      | 0.17g                      | 0.08g                      | 0.08g                      |
| Cinnamon     | -               | 0.17g                      | 0.08g                      | 0.04g                      | 0.049g                     |
| Mint         | -               | 0.57g                      | 0.51g                      | 0.51g                      | 0.34g                      |
| Tulasi       | -               | 0.17g                      | 0.08g                      | 0.04g                      | 0.04g                      |



Fig 2: Tisane dip

**2.2. Formulations:** In this study different formulations have been developed by using different combinations of spices and guava leaves (Table 1 and Fig 2). The formulations include 40% guava leaves 60% spices and the second formulation include 50% guava leaves 50% spices, like wise 60% guava leaves 40% spices and the last formulation include 70% guava leaves and 30% spices.

**2.3. Analysis:** All the formulations were analysed for, Nutritional compositions (The protein content was estimated by using the Kjeldahl apparatus, fat (soxhlet), carbohydrate (anthrone method), ash content (Muffule furnace) and moisture by hot air oven method. The phenolic content was estimated by adopting the method of Mallick and Singh (1980) [7]. Tannin content was analysed by the method of Azeez *et al.*, (2015) [8] using Folin - Ciocalteu reagent and absorbance was read at 725 nm.

**2.4. Sensory evaluation** 9-point hedonic scale was used to evaluate the sensory attributes (color and appearance, flavor, taste and overall acceptability) of the developed tisane dips as described by Akande *et al.* (2017) [9]. All four formulations along with control were evaluated from 1 to 9 (1 – extremely like to 9 – extremely dislike) by the 25 semi trained panels.

**2.5. Rehydration ratios of tea bags:** The rehydration ratios for four different formulations i.e., T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> & T<sub>4</sub> at two different temperatures i.e., 70°C and 100°C within the time intervals of 2 min, 3min, 4min and 5min was done.

### III. RESULTS AND DISCUSSION

**3.1. Nutritional composition:** The highest protein content in T<sub>4</sub> sample is due to increase in guava leaves concentration in the formulation. The lower protein content is observed in T<sub>1</sub> sample because spices dominate the formulation which contain low amount of protein. Guava leaves contains high amount of protein i.e., 18.5% which is

more than combination of all the spices in the formulation. The T<sub>4</sub> sample showed the lower fat content and the highest ash content (4.38±0.03%) due to guava leaves which contain high amount of micronutrients. The low-fat content is due to increase in concentration of guava leaves which contains low fat content (Table 2).

**3.2. Total phenolic content:** It is observed the total phenolic content in the T<sub>4</sub> showed highest 150.1±1.05mg GAE/g among the samples followed by T<sub>3</sub> sample 128.14±1.07 mg GAE/g followed by T<sub>2</sub> sample having 113.13±0.45 mg GAE/g followed by T<sub>1</sub> sample 99.15±1.06 and the control sample recorded least value of 97.15±1.04 mg GAE/g. The highest phenolic content in samples than control sample is due to presence of spices in the sample.

**3.3. Total tannin content:** From the data, the total tannin content is observed highest in control sample 2.84±0.12mg CE/g followed by T<sub>4</sub> (1.21±0.11mg CE/g) when compared to other samples. T<sub>2</sub> sample resulted in least value 1.04±0.16mg CE/g. The highest tannin content is attributed to the amount of guava leaves which contains highest tannin content compared to other ingredients.

**3.4. Rehydration Ratio:** the rehydration ratios at 70°C & 100°C for T<sub>4</sub> sample gave the best results. As the time of dipping increased rehydration ratio increased significantly. Thus, we can conclude that T<sub>4</sub> sample; 70°C & 100°C temperatures and the 5 min time interval are better compared to others respectively (Fig 3).

**3.5. Sensory analysis:** After development of the tisane dips, their acceptability was done using a panel of 25 members. From the data presented in Table 3 and Fig 4) we can observe that test sample 4 has the highest overall acceptability with a mean value of 7.83 when compared to other samples. As the control sample has only guava leaves, the spices which can mask the bitterness of guava leaves are not present in control sample. This might be reason behind the low overall acceptability.

The score for flavor is highest for T<sub>4</sub> and then T<sub>3</sub>, T<sub>1</sub>, T<sub>2</sub> and control sample respectively. The Score for taste is also high for T<sub>4</sub> and then T<sub>2</sub>, T<sub>3</sub>, control sample and T<sub>1</sub> respectively. And coming to appearance and color, the score for this also is high for T<sub>4</sub> and then T<sub>2</sub>, T<sub>1</sub>, T<sub>3</sub> and control sample respectively. So, by this data we can conclude that test sample T<sub>4</sub> has the highest overall acceptability with a mean value of 7.83 has highest appearance & color with a mean value of 7.65; has a highest score for flavor with a mean value of 7.67 and has a highest score for taste with a mean value of 8.19 respectively when compared to other samples.

Table 2: Chemical properties of prepared tisanes

| Chemical properties               | Control sample | T1         | T2          | T3          | T4         |
|-----------------------------------|----------------|------------|-------------|-------------|------------|
| Carbohydrate (%)                  | 60.85±0.01     | 50.05±0.02 | 55.23±0.01  | 54.27±0.12  | 58.75±0.01 |
| Protein (%)                       | 22.98±0.12     | 20.56±0.14 | 21.85±0.10  | 21.96±0.11  | 22.15±0.15 |
| Ash (%)                           | 3.80±0.01      | 3.25±0.03  | 3.68±0.04   | 3.58±0.01   | 4.38±0.03  |
| Fat (%)                           | 1.45±0.04      | 1.63±0.01  | 1.66±0.03   | 1.65±0.02   | 1.63±0.01  |
| Moisture (%)                      | 8.67±1.02      | 5.6±0.12   | 4.6±0.15    | 4.5±0.14    | 4.4±0.11   |
| Total phenolic content (mg GAE/g) | 97.15±1.04     | 99.15±1.06 | 113.13±0.45 | 128.14±1.07 | 150.1±1.05 |
| Total tannin content (mg CE/g)    | 2.84±0.12      | 1.14±0.14  | 1.04±0.16   | 1.15±0.12   | 1.21±0.11  |

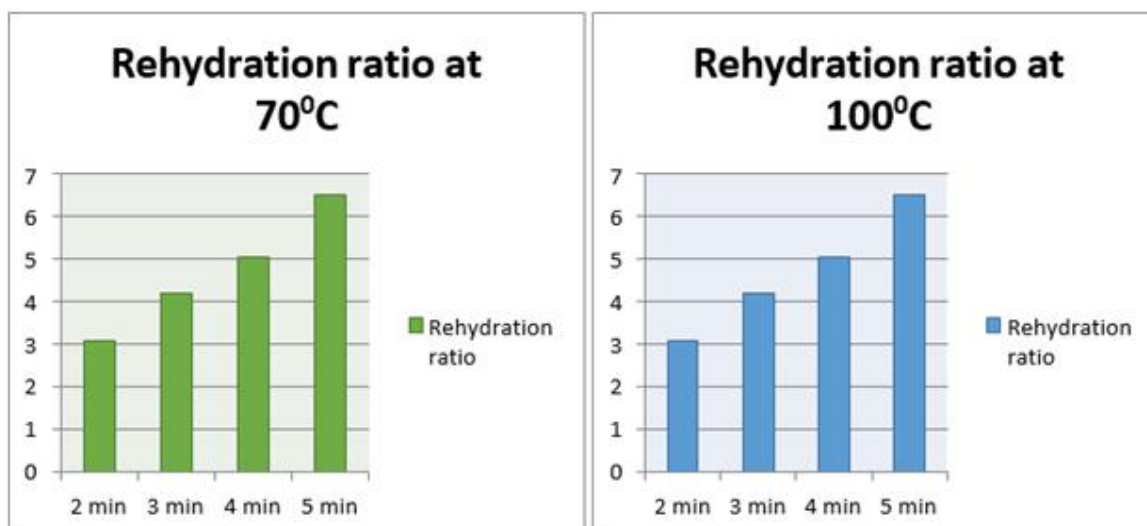


Fig 3: Rehydration ratio at different temperatures and time intervals

Table 3: Sensory analysis of the prepared tisane dips

| Sample         | Appearance and color | Flavor    | Taste     | Overall acceptability |
|----------------|----------------------|-----------|-----------|-----------------------|
| Control sample | 7.13±0.15            | 7.15±0.14 | 7.51±0.12 | 7.26±0.13             |
| T1             | 7.24±0.01            | 7.62±0.02 | 7.21±0.01 | 7.35±0.01             |
| T2             | 7.54±0.03            | 7.52±0.01 | 8.15±0.05 | 7.73±0.04             |
| T3             | 7.15±0.14            | 7.63±0.12 | 7.64±0.15 | 7.47±0.13             |
| T4             | 7.65±0.01            | 7.67±0.02 | 8.19±0.04 | 7.83±0.03             |

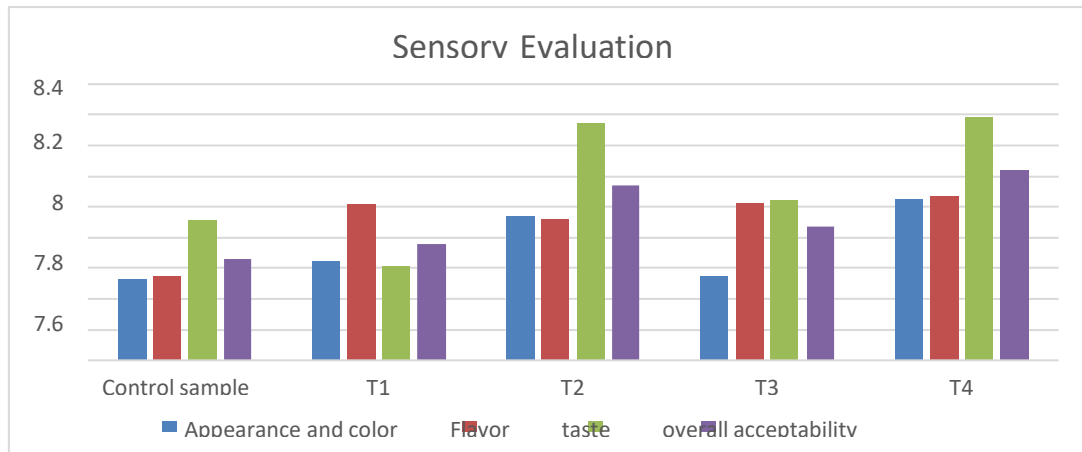


Fig 4: Sensory analysis of the prepared tisane dips

#### IV. CONCLUSION

It was found that the leaves which were not blanched and dried under solar drying method showed better results and better color retention when rehydrated. The protein content found high in the control sample  $22.98 \pm 0.12\%$ , among the test samples T<sub>4</sub> (70:30) sample showed highest amount  $22.15 \pm 0.15\%$ . Total phenolic ( $150.1 \text{ mg GAE/g}$ ) and total tannin content ( $1.214 \text{ mg CE/g}$ ) was recorded higher in T<sub>4</sub> sample when compared to other control and other treatments. This study concludes that the formulation with 70:30 ratio of guava leaves and spice mix showed better results and can be best alternative to commercial tea (*Camellia sinensis*) with various health benefits.

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