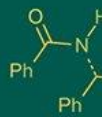


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
IJABR 2026; SP-10(8): 1981-1984
www.biochemjournal.com
Received: 22-05-2026
Accepted: 26-06-2026

C Balaji
B.Sc. (Hons) Agriculture
(Final Year Students) School
of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

P Balamurugan
B.Sc. (Hons) Agriculture
(Final Year Students) School
of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

M Deepak Kumar
B.Sc. (Hons) Agriculture
(Final Year Students) School
of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

N Dharanidaran
B.Sc. (Hons) Agriculture
(Final Year Students) School
of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

M Venkatraman
Assistant Professor and Head,
School of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

K Chozhan
Dean, School of Agricultural
Sciences, Dhanalakshmi
Srinivasan University,
Samayapuram, Trichy,
Tamil Nadu, India

Corresponding Author:
C Balaji
B.Sc. (Hons) Agriculture
(Final Year Students) School
of Agricultural Sciences,
Dhanalakshmi Srinivasan
University, Trichy,
Tamil Nadu, India

Qualitative phytochemical screening of guava (*Psidium guajava*) leaf powder for herbal tea development

C Balaji, P Balamurugan, M Deepak Kumar, N Dharanidaran, M Venkatraman and K Chozhan

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i8Sv.9701>

Abstract

Guava (*Psidium guajava* L.) leaves contain various phytochemicals that may contribute to their traditional use and potential food applications. The present study evaluated the qualitative phytochemical profile of guava leaf powder prepared for potential use in herbal tea development. Healthy guava leaves were collected from the lower, middle, and upper canopy positions, washed, dried using the procedures described in the original study, powdered, sieved, and stored in airtight pouches. Powders obtained from the different canopy positions and drying procedures were pooled before laboratory analysis. Therefore, the present study provides a qualitative phytochemical profile of the pooled guava leaf powder and does not permit treatment-wise comparison of the different drying methods. Qualitative phytochemical screening indicated the presence of carboxylic acid-related constituents, tannins, saponification reaction, proteins, phenols, and saponins. Phenol and saponin tests produced stronger qualitative reactions (++), whereas carboxylic acid-related constituents, tannins, saponification reaction, and proteins produced positive reactions (+). Resins, steroids, flavonoids, carbohydrates, glycosides, biuret reaction, gums, flavonoglycosides, and alkaloids were not detected under the screening conditions used. These findings demonstrate that several classes of phytochemicals were detectable in the pooled guava leaf powder and provide preliminary information relevant to further investigation of its suitability for herbal tea development. However, qualitative screening alone does not establish phytochemical concentrations, biological activity, safety, or functional benefits. Further studies involving quantitative phytochemical estimation, antioxidant and other appropriate biological assays, safety evaluation, sensory assessment, and treatment-wise evaluation of drying methods are required before making functional, health, or commercial claims.

Keywords: Guava leaf, *Psidium guajava* L., herbal tea, phytochemical screening, phenols, saponins, tannins, qualitative analysis

1. Introduction

Medicinal plants have long been used in traditional systems of healthcare and guava (*Psidium guajava* L.) is one of the tropical fruit crops whose leaves have also been used traditionally. Guava belongs to the family Myrtaceae. In addition to the nutritional value of its fruit, the leaves have attracted interest because they contain a range of secondary metabolites and other constituents reported in phytochemical studies. Joseph, B., & Priya, R. M. (2011) ^[1].

Phytochemicals such as phenolic compounds, tannins flavonoids and saponins have been reported from guava leaves and are of interest in food and plant based product development. However, the presence of a compound class in a qualitative screening test should not be interpreted as proof of a particular biological or therapeutic effect. Similarly, qualitative reaction intensity cannot be used as a substitute for quantitative concentration measurement. Drying and powder preparation are important processing steps for plant materials intended for further analysis or product development. The original study collected leaves from different canopy positions and used different drying procedures before producing powder. Because the resulting powders were pooled before phytochemical analysis, the present revised manuscript focuses on the qualitative phytochemical profile of the pooled guava leaf powder rather than claiming an experimental comparison among drying methods.

2. Materials and Methods

2.1 Plant Material and Collection

Healthy guava (*Psidium guajava* L.) leaves were collected from the lower, middle, and upper canopy positions of guava plants. The leaves were selected based on their apparent health and absence of visible damage, disease symptoms, or contamination. Botanical authentication, voucher specimen information, cultivar details, exact collection date, and plant age were not reported in the original manuscript. These details should be incorporated from the original field records, where available, to ensure proper documentation and reproducibility of the study.

2.2 Sample Preparation

The collected guava leaves were washed thoroughly with clean water to remove visible dirt, dust, and other foreign materials. The leaves were then subjected to the drying procedures used in the original study, namely shade drying, sun drying, and hot-air oven drying, as applicable. After drying, the leaves were separately ground into powder and passed through a fine mesh sieve to obtain a relatively uniform particle size.

Following the completion of the respective drying treatments, the powdered samples obtained from the different leaf positions and drying procedures were combined to obtain a single pooled sample. The pooled sample was labelled as guava leaf powder (GL) and stored in airtight, food-grade pouches until further analysis.

2.3 Qualitative Phytochemical Screening

The pooled guava leaf powder (GL) was submitted to a biotechnology laboratory for qualitative phytochemical screening. The screening was conducted to determine the presence or absence of selected phytochemical and related constituent classes in the sample. The tested groups included resins, carboxylic acids, tannins, steroids, flavonoids, carbohydrates, glycosides, saponification reaction, proteins, phenols, biuret reaction, saponins, gums, flavonoglycosides, and alkaloids.

The original manuscript indicates that standard qualitative phytochemical screening procedures were used. However, the available experimental record does not provide sufficient details regarding the individual extraction procedures, extraction solvents, reagents, sample-to-solvent ratios, test volumes, reaction conditions, incubation times, positive controls, or complete laboratory protocols. Therefore, these methodological details should be obtained from the biotechnology laboratory report or laboratory records and incorporated into the final manuscript to ensure methodological transparency and reproducibility.

The qualitative results were recorded using the laboratory's reaction-intensity notation, where (+) represented a positive qualitative reaction and (++) represented a stronger qualitative reaction under the laboratory screening system. A negative result (–) indicated that the corresponding reaction was not detected under the conditions of the test. The (+) and (++) designations were interpreted only as qualitative observations and were not considered quantitative measures of phytochemical concentration.

2.4 Experimental Design and Interpretation

The study used a pooled sample for the reported qualitative phytochemical screening. Although guava leaves were obtained from different canopy positions and subjected to

different drying procedures, the resulting powders were combined before phytochemical analysis. Thus, the reported phytochemical screening represents a single pooled analytical sample (GL) rather than independent samples for each drying treatment or canopy position.

Because the individual treatment samples were pooled before analysis, the present qualitative data cannot be used to statistically compare shade drying, sun drying, and hot-air oven drying. No conclusion regarding the relative effectiveness of these drying methods in preserving phytochemicals can therefore be drawn from the reported screening results.

For future studies, samples from each drying treatment and canopy position should be maintained separately throughout sample preparation and analysis. Independent biological and analytical replicates should be included, and appropriate statistical methods should be applied to determine whether differences among drying treatments are statistically significant.

3. Results and Discussion

The qualitative phytochemical screening results for the pooled guava leaf powder (GL) are presented in Table 1. Positive qualitative reactions were observed for carboxylic acids, tannins, saponification reaction, proteins, phenols, and saponins. Phenols and saponins showed a (++) reaction, whereas carboxylic acids, tannins, saponification reaction, and proteins showed a (+) reaction. Resins, steroids, flavonoids, carbohydrates, glycosides, biuret reaction, gums, flavonoglycosides, and alkaloids were not detected under the screening conditions used.

Table 1: Qualitative phytochemical screening of the pooled guava leaf powder (GL)

S. No.	Test/Compound class	Result
1	Resins	–
2	Carboxylic acids	+
3	Tannins	+
4	Steroids	–
5	Flavonoids	–
6	Carbohydrates	–
7	Glycosides	–
8	Saponification reaction	+
9	Proteins	+
10	Phenols	++
11	Biuret reaction	–
12	Saponins	++
13	Gums	–
14	Flavonoglycosides	–
15	Alkaloids	–

Note: + indicates a positive qualitative reaction, ++ indicates a stronger qualitative reaction under the laboratory screening system, and – indicates that the reaction was not detected under the test conditions.

4. Discussion

The qualitative phytochemical screening demonstrated the presence of several detectable constituent classes in the pooled guava leaf powder (GL), including phenols, tannins, saponins, proteins, and carboxylic acid-related constituents. Positive reactions were also obtained in the saponification test. Phenols and saponins produced a (++) reaction, while carboxylic acids, tannins, proteins, and the saponification reaction produced a (+) reaction. The (++) designation indicates a stronger qualitative reaction under the laboratory

screening system compared with (+). However, this qualitative reaction intensity should not be interpreted as a quantitative measurement of concentration. Therefore, the results do not establish that phenols or saponins were present at high concentrations or that they were the predominant constituents of the sample.

Phenolic compounds and tannins are commonly investigated in plant materials because of their chemical characteristics and reported occurrence in guava leaves. In the present study, both phenols and tannins were detected. However, the screening was qualitative and was not designed to measure antioxidant, antimicrobial, anti-inflammatory, or therapeutic activity. Consequently, such biological activities cannot be directly inferred from the present results. Quantitative phytochemical analysis and appropriate biological assays would be required to establish these activities.

Saponins produced a (++) reaction in the pooled guava leaf powder. Saponins are widely studied as plant secondary metabolites; however, the present experiment did not quantify their concentration or evaluate specific biological effects, such as antimicrobial, immune-related, or cholesterol-lowering activity. Therefore, these effects cannot be concluded from the qualitative screening alone. Further biochemical or biological investigations would be necessary to determine whether the detected saponins contribute to any particular biological activity.

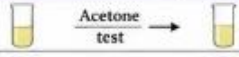
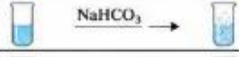
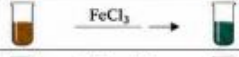
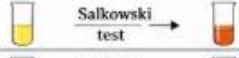
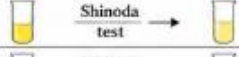
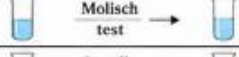
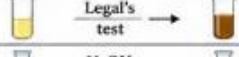
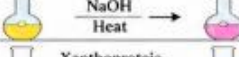
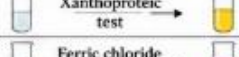
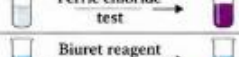
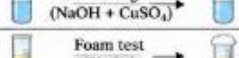
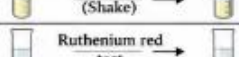
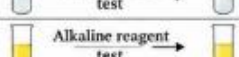
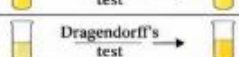
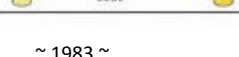
Several tested constituent classes, including resins, steroids, flavonoids, carbohydrates, glycosides, biuret reaction, gums, flavonoglycosides, and alkaloids, showed no detectable reaction under the experimental conditions. These negative results should not be interpreted as definitive evidence that all compounds belonging to these classes are completely absent from guava leaves. Rather, they indicate that the respective reactions were not detected in the tested pooled sample using the particular extraction procedures, reagents,

and assay conditions employed. Qualitative phytochemical results can be influenced by factors such as extraction efficiency, reagent sensitivity, sample composition, and experimental conditions.

An important limitation of the present analysis is that the guava leaf samples obtained from the different drying procedures were pooled before phytochemical screening. Consequently, the present results cannot be used to determine which drying method was more effective in preserving the detectable phytochemical constituents. The results represent the phytochemical profile of the pooled sample rather than the individual drying treatments.

Future comparative studies should therefore maintain samples from each drying treatment separately and use clearly defined drying temperatures and durations. Independent experimental replicates should be included to improve the reliability of the findings, and appropriate statistical analysis should be applied when comparing treatments. Quantitative methods could also be used to determine the concentrations of important phytochemical groups and to assess whether different drying conditions significantly affect their retention.

Overall, the qualitative screening indicates that phenols, tannins, saponins, proteins, and carboxylic acid-related constituents were detectable in the pooled guava leaf powder under the laboratory conditions used. Phenols and saponins produced comparatively stronger qualitative reactions. Nevertheless, the findings should be considered preliminary because the screening does not provide quantitative concentrations or establish biological or therapeutic effects. In addition, because the samples from different drying treatments were pooled, no conclusion can be drawn regarding the relative effectiveness of individual drying methods in preserving phytochemicals.

S. No.	Test/Compound class	Pictorial Diagram (Test/Observation)	Result
1.	Resins	 → No turbidity	—
2.	Carboxylic acids	 → Brisk effervescence (CO ₂ evolved)	+
3.	Tannins	 → Blue-green or blackish colour	+
4.	Steroids	 → No red colour at interface	—
5.	Flavonoids	 → No pink/red colour	—
6.	Carbohydrates	 → No violet ring	—
7.	Glycosides	 → No reddish ring	—
8.	Saponification reaction	 → Soap formation (Emulsion)	+
9.	Proteins	 → Yellow colour developed	+
10.	Phenols	 → Violet / Blue colour	++
11.	Biuret reaction	 → No violet colour	—
12.	Saponins	 → Stable foam (>1 cm)	++
13.	Gums	 → No pink colour	—
14.	Flavonoglycosides	 → No intense yellow colour	—
15.	Alkaloids	 → No orange/brown precipitate	—

5. Significance of the study

The study provides a preliminary qualitative profile of phytochemical groups detected in pooled guava leaf powder. It may serve as a basis for further research on guava-leaf ingredients for herbal -tea development. However, the present results alone do not establish antioxidant activity, medicinal efficacy, safety, sensory acceptability, shelf life, economic feasibility or commercial potential. Such attributes require separate experimental evaluation.

6. Limitations of the study

The principal limitations are the use of one pooled qualitative sample, absence of treatment-wise drying comparisons, incomplete reporting of drying parameters and phytochemicals assay protocols, absence of replication and statistical analysis, and absence of quantitative, safety, sensory and self-life assessments. These limitations restrict the conclusions to the qualitative screening profile of the tested pooled sample.

7. Conclusion

The qualitative phytochemical screening of the pooled guava leaf powder demonstrated the presence of carboxylic acid-related constituents, tannins, saponification reaction, proteins, phenols, and saponins, while several other tested phytochemical classes were not detected under the screening conditions used. Phenol and saponin produced stronger qualitative reactions (++), whereas the other detected constituents showed positive reactions (+). These findings provide preliminary evidence that guava leaf powder contains several detectable phytochemical constituents of potential interest for further investigation and possible herbal tea development.

However, the findings should be interpreted within the limitations of the study. Because samples prepared using different drying procedures were pooled before phytochemical analysis, the present results cannot establish the effect, effectiveness, or superiority of any particular drying method on phytochemical retention. In addition, the qualitative screening does not provide information about the concentrations or biological activities of the detected constituents.

Future studies should therefore analyse drying treatments separately using well-documented drying temperatures and durations, adequate biological and analytical replication, validated quantitative phytochemical assays, antioxidant and safety assessments, sensory evaluation, and appropriate statistical analysis. Such investigations will provide stronger evidence for determining the suitability of guava leaf powder for herbal tea development and should be completed before making functional, health-related, or commercial claims.

References

1. Joseph B, Priya RM. Review on nutritional, medicinal and pharmacological properties of guava (*Psidium guajava*). International Journal of Pharma and Bio Sciences. 2011;2(1):53–69.
2. Gutiérrez RMP, Mitchell S, Solis RV. *Psidium guajava*: A review of its traditional uses, phytochemistry and pharmacology. Journal of Ethnopharmacology. 2008;117:1–27.
3. Singh S, Pal RK. Controlled atmosphere storage of guava fruit. Postharvest Biology and Technology. 2008.
4. Morton JF. Fruits of Warm Climates. Florida: Creative Resource Systems; 1987.
5. Harborne JB. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. Chapman & Hall; 1998.
6. Trease GE, Evans WC. Pharmacognosy. Saunders Elsevier; 2009.
7. Sofowora A. Medicinal Plants and Traditional Medicine in Africa. Spectrum Books; 1993.
8. Trichy Research Institute of Biotechnology Pvt. Ltd. Laboratory Report: Qualitative Phytochemical Screening of Guava Leaf Powder (GL Sample). Trichy: Trichy Research Institute of Biotechnology Pvt. Ltd.