Jurnal Aisyah: Jurnal Ilmu Kesehatan

Volume 10, Issue 1, 03 2025, p. 262-269
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

STANDARIZATION OF SIMPLICIA AND EXTRACTS FROM GUAVA LEAF (*PSIDIUM GUAJAVA*)

Author:

Vicko Suswidiantoro[1)], Ahmad Bayu Satriawan[2)], Cindy Lidya Putri[3)], Budi Setiawan[4)], Adisa Luthfi Safana[5)], Putri Kholifah[6)]

[1]Laboratory of Pharmacology, Pharmacy Department, Faculty of Health, Aisyah University of Pringsewu, 35372, Indonesia
[2]Pharmacy Department,Institute Technology of Sumatera
[3,4,5,6]Undergraduate Programme, Pharmacy Department, Faculty of Health, Aisyah University of Pringsewu, 35372, Indonesia
*Corresponding Email: **vicko.suswidiantoro@aisyahuniversity.ac.id*

About the Author

1. 1st Author : apt. Vicko Suswidiantoro, M.Farm
   Affiliation : Laboratory of Pharmacology, Pharmacy Department, Faculty of Health, Aisyah University of Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : vicko.suswidiantoro@aisyahuniversity.ac.id
   Orcid ID : https://orcid.org/0000-0002-6315-706X
   Google Scholar URL : https://scholar.google.com/citations?user=ybi01IkAAAAJ&hl=en
   Phone number : +6281310194590

   2nd Author : apt. Ahmad Bayu Satriawan
   Affiliation : Institute Technology of Sumatera
   Mailing address : Gedung F ITERA, Terusan Ryacudu, Way Huwi, Kec. Jati Agung, Kabupaten Lampung Selatan, Lampung 35365
   Email of author : Ahmad.satriawan@fa.itera.ac.id
   Orcid ID : 0009-0003-3865-2047
   Google Scholar URL :
   Phone number : 082377333006

   3rd Author : Cindy Lidya Putri
   Affiliation : Pharmacy, Faculty of Health, Aisyah University of Pringsewu.
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
   Email of author : cindylidyaputri31@gmail.com
   Orcid ID : -
   Google Scholar URL : -
   Phone number : +62887437097586

   4th Author : Budi Setiawan
   Affiliation : Pharmacy, Faculty of Health, Aisyah University of Pringsewu
   Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu,

Lampung – Indonesia 35372
Email of author : budie0303@gmail.com
Orcid ID : -
Google Scholar URL : -
Phone number : +6285273311290

5th Author : Adisa Luthfi Safarna
Affiliation : Pharmacy, Faculty of Health, Aisyah University of Pringsewu.
Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
Email of author : adisalutfisafana20@gmail.com
Orcid ID : -
Google Scholar URL : -
Phone number : +6282282947063

6th Author : Putri Kholifah
Affiliation : Pharmacy, Faculty of Health, Aisyah University of Pringsewu
Mailing address : Jl. A. Yani 1A Tambahrejo, Kecamatan Gadingrejo Kabupaten Pringsewu, Lampung – Indonesia 35372
Email of author : putrikholifah332@gmail.com
Orcid ID : -
Google Scholar URL : -
Phone number : +6282292540910

ABSTRACT

The guava leaf (Psidium guajava) is a plant with potential for advancement as a natural treatment. This study aims to establish standardization for both specific and non-specific characteristics of simplicia and extracts. The process for defining standardization parameters relates to the Indonesian Herbal Pharmacopoeia and General Standard Extracts Parameters. The organoleptic standardization of simplicia is defined by a brownish-green coloration, a distinctive fragrance, and a bitter flavor. The water content test indicated 50.4%; the free ethanol content; and a total ash content of 4.06%; the extract standardization denotes a thick green-black extract characterized by a potent aroma and a harsh taste. The foliage of Psidium guajava contains tannins, flavonoids, saponins, and terpenoids. The supplementary statistics comprise an extract yield of 20.96%, a moisture content of 40.93%, and a total ash content of 41.18%. The standardized standards for total ash content and moisture content are not required by Media Materia Indonesia or the Republic of Indonesia Drug and Food Control Center.

Keywords: *Psidium guajava, Simplicia, extract, standardization*

ABSTRAK

Daun jambu biji (Psidium gajava) merupakan tanaman yang berpotensi untuk dikembangkan sebagai obat alami. Penelitian ini bertujuan untuk menetapkan standarisasi yang mencakup parameter spesifik dan non spesifik simplisia dan ekstrak. Metode penetapan parameter standarisasi mengacu pada Farmakope Herbal Indonesia dan Parameter Standar Umum Ekstrak. Standarisasi organoleptik simplisia berwarna hijau kecoklatan, mempunyai bau yang khas, mempunyai rasa pahit. Uji kadar air menunjukkan hasil 50,4%; kandungan etanol gratis; kadar abu total sebesar 4,06%; Standarisasi ekstrak menunjukkan ekstrak kental berwarna hijau kehitaman, berbau kental dan rasa pahit. Daun jambu biji psidium mengandung tanin, flavonoid, saponin, terpenoid. Parameter lainnya adalah rendemen ekstrak sebesar 20,96%; kadar air 40,93%; kadar abu total sebesar 41,18%. Standarisasi parameter kadar abu total, dan kadar air bukan persyaratan dalam Media Materia Indonesia dan Pusat Pengawasan Obat dan Makanan Republik Indonesia)

Kata kunci: *Psidium guajava, simplisia, ekstrak, standarisasi*

INTRODUCTION

The standardization of simplicia and extracts derived from guava leaves (*Psidium guajava*) constitutes a significant step forward in the field of herbal medicine, where consistency and quality are vital for therapeutic effectiveness. Traditionally employed throughout multiple cultures for their antibacterial, anti-inflammatory, and antioxidant qualities, guava leaves have garnered considerable interest in modern phytotherapy. Notwithstanding their conventional application, the scientific community has encountered difficulties in formulating standardized methods for the synthesis and evaluation of these herbal substances. We will systematically investigate the methods that guarantee the purity and efficacy of guava leaf simplicia and extracts, thereby aiding in the production of safe and dependable herbal products that comply with contemporary health requirements (Sahal et al., 2024; Sampath Kumar et al., 2021). Guava leaves, in particular, have been the subject of increasing scientific investigation, as they are known to be a rich source of the flavonoid quercetin (Malik, 2021). Guava leaf (*Psidium guajava*) is widely used in traditional medicine. Guava leaves have antibacterial properties and are used as a chemical that has been found to improve cognitive function and memory performance in several experimental conditions (Nursanty et al., 2023). To understand the mechanisms by which quercetin and other bioactive compounds in guava leaves may exert their beneficial effects, it is important to first establish a reliable and standardized approach to the extraction and characterization of these phytochemicals.

The standardization of herbal medications is essential for guaranteeing their safety, efficacy, and quality, especially for often utilized herbs like Psidium guajava. Standardization enables the determination of uniform doses and active component concentrations, which is essential for therapeutic efficacy. Research indicates that red guava leaf extract exhibits notable analgesic qualities when administered at optimum dosages, underscoring the necessity for accurate standardization to ensure consistent health outcomes (Kunle, 2012). Standardization is crucial for improving the quality control and effectiveness of herbal products, especially for guava leaves (*Psidium guajava*). Standardization enhances the reproducibility of results across many research and reduces variability in bioactive chemicals, which is essential due to the medicinal assertions linked to guava leaves for treating illnesses such as diabetes and inflammation (Wang et al., 2023). Furthermore, the integration of standardized practices fosters consumer trust, as it assures users of the safety and efficacy of derived products such as nutraceuticals and functional foods. As highlighted in recent research, ongoing efforts to innovate applications for guava leaves support a growing body of evidence regarding their multifunctional benefits, enhancing their appeal in the nutraceutical market (Wu et al., 2021). By establishing consistent methodologies for evaluating the chemical and pharmacological profiles of these extracts Moreover, methodologies such as high-performance liquid chromatography (HPLC) have emerged as effective tools in the standardization process, allowing practitioners to differentiate extracts based on their bioactive compounds and antioxidant potentials (Ahmed, 2024)

Simplicia is an unprocessed dry substance that has not been subjected to any treatment procedures (BPOM RI, 2014). Extracts are concentrated formulations from which nearly all solvents have evaporated, leaving the active compounds obtained during extraction (BPOM RI, 2014). The commonly employed technique for extracting chemical constituents from plants is the maceration method, which involves immersing simplicia powder in a solvent at ambient temperature for several days. The maceration technique can prevent damaging thermolabile substances.

Guava leaf (Psidium guajava) is a plant that shows potential as a natural medicine. This study aims to establish standardization for both specific and non-specific characteristics of simplicia and extracts. The process for defining standardization parameters relates to the Indonesian Herbal Pharmacopoeia and General Standard Extracts Parameters. The organoleptic standardization of simplicia is defined by a brownish-green coloration, a distinctive fragrance, and a bitter flavor. The

water content test indicated 50.4%; the free ethanol content; and a total ash content of 4.06%; the extract standardization denotes a thick green-black extract characterized by a potent aroma and a harsh taste. The foliage of Psidium guajava contains tannins, flavonoids, saponins, and terpenoids. The supplementary statistics comprise an extract yield of 20.96%, a moisture content of 40.93%, and a total ash content of 41.18%. The standardized standards for total ash content and moisture content are not required by Media Materia Indonesia or the Republic of Indonesia Drug and Food Control Center (BPOM RI, 2014).

METHOD

1. Materials
   This study employs a range of laboratory equipment, such as glassware, sprayers, vaporizer cups, chambers, separating funnels, glass covers, desiccators,, hot plates, heater mantles, maceration vessels, glass objects, ovens, capillaries, distillation apparatus, analytical scales, and water bath. This study utilized fresh leaves of *Psidium guajava* in conjunction with a range of chemicals.
2. Sample preparations
   Five hundred grams of Simplicia guava leaf powder were macerated with 96% ethanol solvent for three consecutive 24-hour periods, with stirring every eight hours and a solvent replacement of the same type and volume every 24 hours. The macerate is further filtered through filter paper and concentrated in a water bath at 50 °C. Evaporation is conducted to get extracts of Psidium guajava with a certain weight (Kementrian Kesehatan Republik Indonesia, 2017)
3. Simplisia and extract standarization
   Spesific parameters test
   a. Organoleptic test
   Organoleptic testing assesses color, shape, scent, and taste through the five senses, conducted without instruments after a 15-minute exposure of Simplicia to air.
   b. Ethanol-soluble extract and water-soluble extract
   Five grams of guava leaf simplicial and extract powder were macerated in 100 milliliters of 96% ethanol and chloroform-saturated water. The extract undergoes stirring for six hours, followed by an 18-hour settling period. Twenty milliliters of filtrate underwent filtration and was subsequently evaporated in a water bath at 105 °C until a constant weight was achieved. Levels are expressed as a percentage of dissolved compounds relative to the weight of the original basic constituents.

   Non specific parameters test
   a. Dry shrinkage
      A total of 1 g of guava leaf simplicia and extract was uniformly deposited into the calibrated crucible.The crucible holding simplicia is positioned in an oven at 105°C for one hour in an open state. The crucible is then weighed and reheated until a consistent weight is attained.
   b. Total ash and insoluble acid ash
      A total of 3 g of guava leaf Simplicia powder was placed into compacted crucibles, subjected to a temperature of 800 °C in the furnace, then cooled and weighed. Ash, obtained from the evaluation of total ash content, was subjected to treatment with 25 ml of 1 N HCl and heated for five minutes.The acid-insoluble fraction is obtained and filtered. The samples are rinsed with hot water, transferred to a crucible, and weighed until a consistent weight is obtained.
   c. Phytochemical screening

The secondary metabolite are all tested for phytochemical properties. 0.5 g of guava leaf ethanol extract was diluted in 25 ml of 96% ethanol before being divided into eight tubes. Alkaloids are identified using Dragendorff and Mayer's reagents, whereas terpenoids and steroids are identified using Liebermann-Burchard reagents.The flavonoids were detected using concentrated magnesium and hydrochloric acid powders. Saponins are identified via a foam test with water.The tannin test uses 1% gelatin and 10% methanolic KOH. Glycosides were identified using concentrated chloroform and sulfuric acid. The detection of phenolic compounds at a concentration of 10% was performed using 10% $FeCl_3$

d. Moisture content
Moisture content is measured through distillation.Five grams of extract were added to a round-bottom flask, followed by the addition of 200 ml of water-saturated toluene. The mixture was then heated at 105 °C for a duration of 150 minutes. The volume of water is quantified and computed in relation to the weight of the initial extract expressed as a percentage.

4. Data analysis
This study's data included quantitative and qualitative information, which were analyzed descriptively. Quantitative statistics include water content, water-soluble extract, ethanol-soluble extract, total ash content, and insoluble ash content.

RESULTS AND DISCUSSION

The plant identification results for the investigation indicated Psidium guajava of the Myrtaceae family, as per a letter from PT. Palapa Muda Perkasa No. 996/IPH.1.08/If.20/I/2024. The organoleptic study of simplicia aims to reveal the features that aid in the identification of the physical properties of Psidium guajava leaf simplicia. The organoleptic characteristics of Psidium guajava simplicia are brownish-green coloration, a bitter taste, and a distinctive odor. The green coloration results from the concentration of chlorophyll. The astringent flavor likely arises from tannin compounds and alkaloids, whereas the piquant flavor is associated with essential oils. Psidium guajava, like other species in the Myrtaceae family, possesses a strong, acrid fragrance, with an extract yield of 20.96%.

Table 1. The results of the standardization parameters of *Psidium guajava* leaf Simplicia standardization

Parameters		Results
Saponin		+
Alkaloid	Dragendorf	++++
	Mayer	++++
	Wagner	-
Flavonoid		++
Tanin	$FeCl_3$ 1%	+++++
Triterpenoid		+++++
Total Ash content		4.6

(%)	

The assessment of water-soluble extracts provides important insights into the chemical concentration in water when using Psidium guajava Simplicia as a raw material in traditional medicine. Water-soluble chemicals encompass quaternary alkaloids, saponins, carotenoids, and tannins, among others. Substances that dissolve in ethanol include phenols, terpenoids, steroids, alkaloids, aglycones, glycosides, and volatile oils (Detri Susanti, 2023; Panjaitan et al., 2012; Zulharmitta et al., 2017).

Table 2. The results of the standardization parameters of *Psidium guajava* leaf extract standardization

Parameters		**Results**
Saponin		+
Alkaloid	Dragendorf	-
	Mayer	-
	Wagner	-
Flavonoid		+
Tanin	$FeCl_3$ 1%	+
Triterpenoid		+
Total Ash content (%)		40.93
Dry shrinkage (%)		41.18
Alcohol Content		0

The determination of drying shrinkage seeks to establish the limits and ranges of chemicals lost during the drying process of the sample (Kemenkes, 2000). The drying process is performed to reduce the risk of simplicia contamination by mold and fungus. Elevated water content in simplicia will cause most of the weights recorded during extraction to be ascribed to water, leading to a reduced quantity of the desired chemical (Isrianto et al., 2021).
Total ash content indicates the amount of both inherent and extrinsic minerals in the sample. Internal minerals are those obtained from plant tissue, include calcium, phosphorus, and magnesium (Utami et al., 2017; WHO, 1998). This investigation indicated that elevated dry shrinkage levels result in an increased tensile stress, potentially leading to cracking, internal warping, and outward bending.

LIMITATION OF THE STUDY

There are several limitations in our studies that should be addressed in future studies, such as the comprehensive test of heavy metal contamination.

CONCLUSIONS AND SUGGESTIONS

The findings about the standardization criteria of Simplicia and extracts from Psidium guajava leaf to ensure the quality of simplicial and extract.

Acknowledgment

ETHICAL CONSIDERATION

Funding Statement.

The funding of this study was supported by the Ministry of Research and Technology of the Republic of Indonesia BIMA [0459/E5/PG.02.00/2024].

Conflict of Interest Statement

There is no conflict of interest in this studies

REFERENCES

Ahmed, R. (2024). *High-Performance Liquid Chromatography and In Pharmaceutical Sciences*. *November*.

BPOM RI. (2014). Peraturan Kepala Badan Pengawas Obat Dan Makanan Republik Indonesia Nomor 12 Tahun 2014 Tentang Persyaratan Mutu Obat Tradisional. *Badan Pengawas Obat Dan Makanan*, 1–25.

Detri Susanti, S. (2023). *Antioxidants And Total Phenolics From Plants Of The Malvaceae Family*. *21*(1), 1–07. https://jurnal.kimia.fmipa.unmul.ac.id/index.php/JKM

Isrianto, P. L., Kristianto, S., & Wilujeng, S. (2021). Microscopic Characterization of Keji Beling Extract (Strobilanthes crispus L.) As Herbal Medicine Studies. *Jurnal Biota*, *7*(2), 109–117. https://doi.org/10.19109/biota.v7i2.8382

Kemenkes, R. (2000). *Parameter Standar Umum Ekstrak Tumbuhan Obat*.

Kementrian Kesehatan Republik Indonesia. (2017). *Farmakope Herbal Indonesia Edisi II* (II). Kementrian Kesehatan Republik Indonesia. https://doi.org/10.2307/jj.2430657.12

Kunle. (2012). Standardization of herbal medicines - A review. *International Journal of Biodiversity and Conservation*, *4*(3), 101–112. https://doi.org/10.5897/ijbc11.163

Malik, K. (2021). Daun Menggunakan Convolutional Neural Networks. *Klasifikasi Jenis Jambu Biji Berdasarkan Tekstur Daun Menggunakan Convolutional Neural Networks*, *6*, 19–28.

Nursanty, R., Padzil, K. N. B. M., Ramli, N. I. B., Mahyudin, N. A., Jaafar, A. H. Bin, & Rukayadi, Y. (2023). Phytochemical analysis of ethanolic Psidium guajava leaves extract using GC-MS and LC-MS. *Biodiversitas*, *24*(5), 2723–2732. https://doi.org/10.13057/biodiv/d240526

Panjaitan, E. N., Saragih, A., & Purba, D. (2012). Formulasi Gel Dari Ekstrak Rimpang Jahe Merah (Zingiber officinale Roscoe) Gel Formulation of Red Ginger (Zingiber officinale Roscoe) Extract. *Journal of Pharmaceutics and Pharmacology*, *1*(1), 9–20.

Sahal, A., Chaudhary, S., Hussain, A., Arora, S., & Dobhal, A. (2024). Grain & Oil Science and Technology A comprehensive review on the nutritional composition , bioactive potential , encapsulation techniques , and food system applications of guava (Psidium guajava L .) leaves. *Grain & Oil Science and Technology*, *October*. https://doi.org/10.1016/j.gaost.2024.12.003

Sampath Kumar, N. S., Sarbon, N. M., Rana, S. S., Chintagunta, A. D., Prathibha, S., Ingilala, S. K., Jeevan Kumar, S. P., Sai Anvesh, B., & Dirisala, V. R. (2021). Extraction of bioactive compounds from Psidium guajava leaves and its utilization in preparation of jellies. *AMB Express*, *11*(1). https://doi.org/10.1186/s13568-021-01194-9

Utami, Y. P., Umar, A. H., Syahruni, R., & Kadullah, I. (2017). Standardisasi Simplisia dan Ekstrak Etanol Daun Leilem (Clerodendrum. *Journal of Pharmaceutical and Medicinal Sciences*, *2*(1), 32–39.

Wang, H., Chen, Y., Wang, L., Liu, Q., Yang, S., & Wang, C. (2023). Advancing herbal medicine: enhancing product quality and safety through robust quality control practices. *Frontiers in Pharmacology*, *14*(September), 1–16. https://doi.org/10.3389/fphar.2023.1265178

WHO. (1998). Quality control methods for medicinal plant materials World Health Organization Geneva. *Who*. https://doi.org/10.1016/j.pbi.2015.01.003

Wu, W., Zhang, A., van Klinken, R. D., Schrobback, P., & Muller, J. M. (2021). Consumer trust in food and the food system: A critical review. *Foods*, *10*(10), 1–15. https://doi.org/10.3390/foods10102490

Zulharmitta, Z., Kasypiah, U., & Rivai, H. (2017). Pembuatan Dan Karakterisasi Ekstrak Kering Daun Jambu Biji (Psidium guajava L.). *Jurnal Farmasi Higea*, *4*(2), 147–157. https://jurnalfarmasihigea.org/index.php/higea/article/view/70