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PSIDIUM GUAJAVA (GUAVA LEAF): A REVIEW ON ITS PHYTOCHEMISTRY AND MEDICINAL USES

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ABSTRACT

Psidium guajava L. (guava) is a tropical plant widely recognized for its diverse therapeutic applications and rich phytochemical profile. The leaves of *P. guajava*, in particular, have been extensively used in traditional medicine across tropical and subtropical regions, including the Philippines, for the treatment of wounds, infections, diarrhea, fever, and diabetes. This narrative review aims to summarize and evaluate existing literature on the phytochemistry and medicinal uses of *P. guajava* leaves, with emphasis on the major bioactive compounds responsible for its pharmacological activities. Relevant studies were sourced primarily from Google Scholar using keywords such as "Psidium guajava," "guava leaf," "phytochemistry," and "medicinal uses," covering publications from 2000 to 2026. Findings reveal that guava leaves contain a diverse array of bioactive constituents — including quercetin, rutin, tannins, flavonoids, oleanolic acid, β-caryophyllene, and ellagic acid — that confer significant antimicrobial, anti-inflammatory, antioxidant, antidiarrheal, and antidiabetic effects. These properties are supported by both ethnomedicinal records and preclinical evidence derived from *in vitro* and animal-based studies. While the evidence strongly validates the traditional use of *P. guajava* leaves, clinical studies in human populations remain limited. This review underscores the therapeutic potential of *P. guajava* leaves and highlights the need for standardized research and clinical trials to facilitate their integration into evidence-based healthcare practices.

KEYWORDS: *Psidium guajava*, Guava leaf, Phytochemistry, Medicinal Uses.

1. INTRODUCTION

The use of medicinal plants remains an essential component of healthcare systems worldwide, particularly in developing countries where access to conventional medicines may be limited. Among these plants, Psidium guajava L. (Guava) has been widely recognized for its diverse therapeutic applications and rich phytochemical profile. The leaves of P. guajava are especially valued in traditional medicine due to their reported antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties.

These pharmacological activities are primarily attributed to the presence of bioactive compounds such as flavonoids, tannins, saponins, and other secondary metabolites. In the Philippines and other tropical regions, guava leaves have long been used as decoctions for the treatment of wounds, infections, and gastrointestinal disorders, reflecting their importance in ethnomedicine.

The objective of this review is to summarize and evaluate existing literature on the phytochemistry and medicinal uses of *P. guajava* regarding its medicinal uses. The focus of this review is the leaf of the guava, the medicinal properties, as well as its phytochemical properties, highlighting the major bioactive compounds found in the leaf that contribute to its medicinal properties.

1.1. Botanical and taxonomic description of Psidium guajava

Guava is a widely cultivated fruit in India, Pakistan, Bangladesh, Indonesia, South America, and other tropical and subtropical regions (Kumar et al., 2022; Rehman & Khan, 2022). It belongs to the following taxonomic categories: Myrtaceae family, Myrtoideae subfamily, Myrteae tribe, Magnoliophyta division, Magnoliopsida class, Rosidae subclass, Myrtales order, Psidium genus, and Guajava species. The botanical classification of guava is, Psidium guajava species, Psidium genus, Myrtaceae family, Myrtales order, Rosidae class, and Plantae kingdom.

Guava is a small, shrubby tree that can grow up to 10 m tall. Its fruit is round, oval, or pear-shaped, varying in size from 1 to 48 oz (Kafle et al., 2018). When ripe, guava emits a strong, sweet, and musky aroma. The outer peel can be either green or yellow, while the flesh comes in various colors, including white, yellow, pink, and red. It also contains numerous small, hard, and white seeds. Guava leaves are 1 to 2 inches wide with a 2 to 6 inch length. They are dull-green and rigid and coriaceous with prominent veins (Jamieson et al., 2022).

1.2 Traditional Medicinal Uses of Psidium guajava leaf

In Philippine traditional herbal medicine, guava leaf decoctions have long been used as antiseptics and wound cleansers, supporting their applicability in low-resource veterinary settings where accessible and low-cost treatments are needed.

Psidium guajava, also known as guava, has been widely used since ancient times as a traditional medicine. According to several studies, guava leaves are known for their therapeutic effects and are used in herbal medicine to treat various health conditions. Traditionally, guava leaves are used for their antimicrobial, anti-inflammatory, anti-diarrheal, and antioxidant effects (Biswas et al., 2013).

Guava leaves are used as decoctions and also to treat diarrhea and gastrointestinal disorders due to their astringent effect. They are also applied to wounds and skin infections to aid healing and prevent bacterial growth or spread. Crushed guava leaves are commonly used for this purpose. According to Gutierrez et al. (2008), guava leaf extract is also used to treat toothache and oral infections due to its antibacterial activity.

Moreover, guava leaves are used in traditional remedies to manage diabetes because they help regulate blood sugar levels. In some cultures, guava leaf extracts are also used to reduce fever and alleviate coughs and colds. Table 1 shows the compiled traditional medicinal applications of *P. guajava* leaves.

Table 1. Traditional Medicinal Uses of *Psidium guajava* Leaf.

Applied to wounds and skin infections to promote faster healing and provide antimicrobial effects.	Biswas et al., 2013
Used to treat diarrhea and gastrointestinal problems because of its astringent effect.	Gutiérrez et al., 2008
Used to help relieve toothaches and oral infections.	Gutiérrez et al., 2008
Utilized in managing blood sugar levels, showing antidiabetic properties.	Biswas et al., 2013
Used to reduce symptoms of fever, cough, and colds.	Biswas et al., 2013

2. METHODOLOGY

This study employed a narrative design to compile, summarize, and review the current literature on the phytochemistry, pharmacological activity, and medicinal uses of Psidium guajava leaf. Relevant literature was primarily obtained from Google Scholar, with Google used to locate additional open-access articles. The search was conducted using the following keywords: "Psidium guajava, "Guava leaf", "phytochemistry", "phytochemical composition", "pharmacological activity", "medicinal uses." Articles published between 2000 and 2026 were selected to include both older and more recent findings, given the limited number of available studies on this particular part of the plant. Additional sources were obtained through manual searching of references on related studies.

3. Phytochemistry of Psidium guajava leaf

Möwes et al. (2025) reported that guava leaf extracts possess significant antimicrobial and antioxidant activity in vitro, confirming the plant's potential for external use. Villanueva and Mendoza (2019) also documented the traditional use and the phytochemical properties of guava leaves in Philippine herbal medicine, emphasizing their relevance to community-based animal care practices.

Table 2. Major phytochemical compounds found in *Psidium guajava* leaf.

Major Compounds	Reported Pharmacologic Activities	References
α-Terpineol	Antioxidant, anti-inflammatory; It may have potential benefits for respiratory health and relaxation	Borah et al., 2019
β-Caryophyllene (trans-caryophyllene)	Cannabinoid receptor modulator Anti-inflammatory, analgesic	de Sousa et al., 2007
Rutin	Anti-oxidant	Legault & Pichette, 2007
α-Humulene	Anti-inflammatory, analgesic, anti-cancer	Frutos MJ, Frutos LR, Cases EV,

		2019
Oleanolic acid (OA)	Anti-oxidant, anti-inflammatory, anti-cancer	Kahn & White, 1988; Pollier & Goossens, 2012; (Wang et al., 2013)
Quercetin	Anti-oxidant, anti-inflammatory, anti-allergy, anti-bacterial	Ko et al., 2017; Yang et al., 2020; Osonga et al., 2019
Flavonoids	Anti-oxidant	Zeisel et al., 2013; Panche et al., 2016
Tannins	Antimicrobial, anti-oxidant	Cushnie & Lamb, 2005
Lectins	Potential anti-cancer effects,	Kamath et al., 2008
Ellagic acid	Anti-oxidant, potential anti-cancer effects	Kamath et al., 2008
Beta-sitosterol	Cholesterol-lowering agent, supports prostate health	Kamath et al., 2008
Uvaol, oleanolic, and ursolic acids	Anti-inflammatory, anti-oxidant	Kamath et al., 2008

4. Pharmacological activities of *Psidium guajava* leaf

Psidium guajava leaves are well known for their antimicrobial activity, which effectively inhibits the growth of various bacterial and fungal pathogens. Numerous studies have shown that it contains abundant bioactive compounds, mainly flavonoids, phenolic acids, tannins, terpenoids, and essential oils that are responsible for its pharmacological effects (Pérez Gutiérrez et al., 2008). Psidium guajava is traditionally used globally to treat gastrointestinal disorders such as diarrhea, dysentery, and stomach pain, while also serving as a remedy for wounds, toothache, fever, and inflammation (Pérez Gutiérrez et al., 2008).

Scientific evidence confirms that the widespread traditional use of Psidium guajava in treating diarrhea, infectious diseases, and convulsions is attributed to its potent antimicrobial, antispasmodic, and neurodepressant activities.

Table 3. Summary of Neurological and Anti-epileptic Effects of Psidium Guajava leaf.

Extract/ Compound	Experimental Model	Observed Effect	Mechanism Proposed	References
Quercetin	Neuronal Excitability Assay	Slowed gastrointestinal transit; reduced hypermotility	Inhibition of smooth muscle contraction via Calcium antagonism	Lutterodt, 1989; Pérez Gutiérrez et al., 2008
Aqueous Leaf Extract	Pentylenetetrazol (PTZ)-Induced Seizure in Rats/Mice	Prolonged seizure latency; reduced convulsion duration and mortality	Enhancement of GABAergic inhibitory neurotransmission; suppression of neuronal hyperexcitability	Morton, 1987; Pérez Gutiérrez et al., 2008

Table 3.1 Summary of Gastrointestinal, Anti-Inflammatory, and Antimicrobial Effects of Psidium guajava leaf.

Extract/ Compound	Experimental Model	Observed Effect	Mechanism Proposed	References
Aqueous Leaf Extract	Castor Oil-Induced Diarrhoea in Rats: Enteropooling Assay	Reduced defecation frequency and faecal volume Inhibited intestinal fluid accumulation Antidiarrhoeal efficacy comparable to Loperamide	Antisecretory effect: Inhibits prostaglandin E_2 and cAMP-mediated fluid secretion Antimotility effect: Reduces intestinal hyper-peristalsis	Gutiérrez et al., 2015
Methanolic Leaf Extract	Carrageenan-Induced Paw Oedema in Rodents	Dose-dependent reduction in swelling and inflammatory exudate	Suppression of pro-inflammatory cytokines (TNF-α, IL-6); inhibition of COX-2 and NF-κB signalling	Ruchitha et al., 2025; Pérez Gutiérrez et al., 2008
Tannins (Leaves/Bark)	Enterotoxigenic Escherichia coli (ETEC) Model	Inhibition of bacterial adhesion and toxin production; reduction in intestinal mucosal damage	Astringent action on gut mucosa; protein precipitation; suppression of virulence factors	Gutiérrez et al., 2017; Pérez Gutiérrez et al., 2008

5. DISCUSSION AND LIMITATIONS

The findings of this review affirm the significant therapeutic potential of *Psidium guajava* leaves, which have been widely utilized in traditional medicine across tropical regions, including the Philippines. The phytochemical profile of guava leaves — particularly the presence of quercetin, rutin, tannins, flavonoids, oleanolic acid, and β-caryophyllene — provides a strong biochemical basis for their reported pharmacological activities, including antimicrobial, anti-inflammatory, antioxidant, antidiarrheal, and antidiabetic effects. The convergence of ethnomedicinal use and scientific

evidence highlights the relevance of *P. guajava* as a candidate for further pharmaceutical development and community-based healthcare applications.

However, this review is not without limitations. First, the majority of studies reviewed were conducted *in vitro* or in animal models, and clinical trials in human populations remain limited. This constrains the direct extrapolation of findings to human therapeutic applications. Second, there is considerable variability in the extraction methods, solvents, and concentrations used across studies, making direct comparisons of bioactivity difficult. Third, most reviewed studies did not standardize the plant material in terms of geographical origin, growth conditions, or leaf maturity — all of which may influence the phytochemical composition and potency of extracts. Finally, the reliance on Google Scholar as the primary database, with supplementary manual searches, may have introduced selection bias and excluded studies published in non-indexed or non-English-language journals.

6. Future Research

Future studies should prioritize well-designed clinical trials to establish the safety, efficacy, and optimal dosing of *P. guajava* leaf preparations in human subjects. Standardization of extraction protocols is essential to ensure reproducibility and comparability of results across studies. There is also a need for pharmacokinetic and pharmacodynamic investigations to better understand how the bioactive compounds are absorbed, metabolized, and eliminated in the human body.

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Research into the synergistic interactions among the various phytochemical constituents — such as quercetin, tannins, and flavonoids — would provide deeper insight into the mechanisms underlying the plant's broad therapeutic effects. Additionally, investigations into the development of standardized herbal formulations, such as capsules, topical preparations, or oral solutions derived from guava leaf extract, would support its integration into formal healthcare and veterinary systems, particularly in low-resource settings. Studies focusing on the antidiabetic, anticancer, and neuroprotective properties of specific isolated compounds, such as oleanolic acid and β-caryophyllene, also represent promising avenues for future inquiry.

7. CONCLUSION

This review demonstrates that *Psidium guajava* leaves possess a rich and diverse phytochemical profile that underpins a wide range of pharmacological activities. The major bioactive compounds identified — including flavonoids, tannins, quercetin, rutin, and oleanolic acid — are consistent with the plant's long-standing use in traditional medicine for the management of infections, gastrointestinal disorders, inflammation, and diabetes. Scientific evidence, though largely preclinical, strongly supports the ethnomedicinal applications of guava leaves documented across tropical regions, including the Philippines.

Psidium guajava represents a promising and accessible source of bioactive compounds with significant therapeutic value. To fully realize its clinical potential, however, rigorous human trials, standardized methodologies, and further mechanistic studies are needed. This review contributes to the growing body of literature validating the medicinal importance of *P. guajava* and advocates for its continued investigation as a viable component of integrative and community-based healthcare.

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