

**ETHANOMEDICINAL USES AND PHARMACOLOGICAL
EVALUATION OF PSIDIUM GUAJAVA L.**

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ABSTRACT

Psidium guajava (L.), commonly known as guava, is a tropical fruit plant belonging to the family Myrtaceae and is widely cultivated in countries such as India, Indonesia, Pakistan, Bangladesh, and South America. Guava leaves contain a wide range of biologically active phytochemicals, including flavonoids, phenolic compounds, and tannins. Major constituents reported in the leaves include quercetin, avicularin, apigenin, guaijaverin, kaempferol, hyperin, myricetin, gallic acid, catechin, epicatechin, chlorogenic acid, epigallocatechin gallate, and caffeic acid.

Various studies have demonstrated that guava leaf extracts possess several pharmacological activities, including antioxidant, antimicrobial, antidiabetic, antidiarrheal, anticancer, hepatoprotective, and lipid-lowering effects. These beneficial properties are mainly attributed to the presence of diverse phytoconstituents present in the leaves. Therefore, guava leaves have considerable potential for use in pharmaceutical and functional food preparations. However, further experimental and clinical studies are required to establish their therapeutic efficacy and safety.

KEY WORDS: *Psidium guajava* L., Guava leaf; Phytoconstituents, Flavonoids, Phenolic compounds, Pharmacological activities, Medicinal plants.

INTRODUCTION

Ethnomedicine refers to the traditional healthcare practices developed and followed by indigenous communities based on their cultural beliefs and knowledge of natural remedies. Traditional systems such as Indian Ayurveda and Traditional Chinese Medicine have been practiced for centuries and continue to play an important role in promoting health and managing various diseases. Since medicinal plants have long been used as natural therapeutic agents, they have attracted considerable attention in modern research for the identification of bioactive compounds with potential pharmaceutical applications.

Psidium guajava L., commonly known as guava, is a small tree belonging to the family Myrtaceae. It is native to tropical regions extending from southern Mexico to northern South America and is now widely cultivated in tropical and subtropical regions across the world. Guava leaves have a long history of traditional medicinal use in several countries, particularly for the management of diarrhoea. Various traditional applications of guava leaves have also been reported in different parts of the world, with the method of administration depending on the condition being treated.

Preparations such as decoctions, infusions, and boiled leaf extracts are traditionally consumed orally for conditions including diarrhoea, rheumatism, diabetes mellitus, and cough, particularly in countries such as India, China, Pakistan, and Bangladesh. In some Southeast Asian communities, guava leaf preparations are used as gargles for oral conditions such as mouth ulcers. In Nigeria, they have also been traditionally used for oral hygiene and antibacterial purposes. For skin-related conditions and wound care, crushed leaves or poultices are applied externally in countries including Mexico, Brazil, the Philippines, and Nigeria. The use of guava leaves in the form of chewing sticks for maintaining oral hygiene has also been documented in Nigeria.



Figure 1.(A)



Figure2. (B)

Figure 1. (A) Guava fruit and leaves (b) guava leaf with dorsal view on the left and ventral view on the right.

PLANT PROFILE OF *Psidium guajava* L.

Scientific name	<i>Psidium guajava</i> L.
Common name	Guava
Family	Myrtaceae
Kingdom	Plantae
Division	Magnoliophyta (Angiosperms)
Class	Magnoliopsida (Dicotyledons)
Order	Myrtales
Genus	<i>Psidium</i>
Species	<i>Psidium guajava</i> L

ETHNOMEDICINAL USES OF *Psidium guajava* L.

Psidium guajava L., belonging to the family Myrtaceae, is an important medicinal plant that has been traditionally used across tropical and subtropical regions of Asia, Africa, Central America, and South America. Various parts of the plant, including the leaves, bark, roots, fruits, and young shoots, have been employed in traditional healthcare practices for the management of a wide range of ailments. Among these, the leaves are the most commonly utilized plant part because of their diverse therapeutic applications.

Traditionally, guava leaves are prepared as decoctions, infusions, or boiled extracts and administered orally for the management of gastrointestinal disorders such as diarrhoea, dysentery, gastroenteritis, and stomachache. Leaf preparations have also been traditionally used for conditions including diabetes mellitus, fever, cough, sore throat, and hypertension. In several indigenous communities, the leaves are chewed or used as oral rinses for maintaining oral hygiene and managing conditions such as toothache, gingivitis, mouth ulcers, swollen gums, and halitosis. These applications are considered to be associated with the antimicrobial, anti-inflammatory, and wound-healing properties of guava leaves, thereby supporting their traditional use in oral healthcare.

The topical application of guava leaves has also been reported for the management of wounds, burns, skin infections, ulcers, and other inflammatory conditions. Other plant parts have specific traditional applications; for example, the bark is used as an astringent in the treatment of diarrhoea and dysentery, whereas the roots have been traditionally employed for gastrointestinal complaints. The fruits are primarily consumed as a nutritious food and have also been used traditionally to support digestion, relieve constipation, and promote general health.

Ethnobotanical investigations have reported the traditional use of *P. guajava* in numerous countries, highlighting its widespread importance in indigenous healthcare systems. Among the different plant parts, the leaves are consistently reported as one of the most frequently used, with decoction being a predominant method of preparation and oral administration being a common route of use. The extensive traditional applications of guava have encouraged scientific investigation of its pharmacological properties. Studies on guava leaf extracts have reported several biological activities, including antimicrobial, antioxidant, anti-inflammatory, antidiarrheal, antidiabetic, and wound-healing effects. These findings provide a scientific basis for the continued investigation of *P. guajava* leaves as a potential source of bioactive compounds for pharmaceutical and herbal healthcare applications.

PHARMACOLOGICAL ACTIVITIES OF *Psidium guajava* L.

Psidium guajava L. has been extensively investigated for its diverse pharmacological properties, which are mainly attributed to its flavonoids, phenolic compounds, tannins, terpenoids, and other bioactive constituents. Various experimental studies have demonstrated antioxidant, antimicrobial, antidiabetic, hepatoprotective, antidiarrhoeal, anti-inflammatory, analgesic, antifungal, antiplaque, and other biological activities.

- **Antioxidant Activity:** Guava extracts prepared using distilled water, 65% ethanol, and 95% ethanol have demonstrated significant antioxidant activity by scavenging hydroxyl radicals and inhibiting lipid peroxidation. The activity was observed in a concentration-dependent manner, indicating the potential of guava extracts to protect biological systems against oxidative stress.
- **Antitussive Activity:** The aqueous extract of *P. guajava* has demonstrated antitussive activity in experimental models of cough. Oral administration of the extract significantly reduced capsaicin-induced coughing, with greater inhibition observed at higher doses, suggesting its potential as a traditional remedy for cough.
- **Antidiabetic Activity:** Guava extracts have demonstrated hypoglycaemic activity in experimental models of diabetes. Ethanolic stem bark extracts produced significant reductions in blood glucose levels in alloxan-induced hyperglycaemic rats. Similarly, aqueous extracts administered orally at appropriate doses showed significant hypoglycaemic effects, supporting the traditional use of guava in the management of diabetes.
- **Antimicrobial Activity:** Aqueous bark and methanolic extracts of *P. guajava* have exhibited antibacterial activity against various pathogenic microorganisms. Several antibacterial flavonoids have been isolated from guava leaves, including morin glycosides,

which demonstrated inhibitory activity against organisms such as *Salmonella enteritidis* and *Bacillus cereus*. These findings indicate the potential of guava leaves as a source of natural antimicrobial compounds.

- **Hepatoprotective Activity:** Aqueous leaf extracts of *P. guajava* have shown hepatoprotective effects in experimental studies. The observed activity suggests that guava leaves may provide protection against hepatic damage and may be associated with their antioxidant and anti-inflammatory phytoconstituents.
- **Antidiarrhoeal Activity:** Aqueous leaf extracts of *P. guajava* have demonstrated significant antidiarrhoeal activity in experimental animal models. The extracts reduced castor oil-induced diarrhoea, intestinal motility, enteropooling, and the frequency and severity of defaecation. These findings provide pharmacological support for the traditional use of guava leaves in the treatment of diarrhoeal disorders.
- **Antiplaque Activity:** Guajaverin, a flavonoid isolated from *P. guajava* leaves, has demonstrated potential antiplaque activity by inhibiting the growth of *Streptococcus mutans*, an important microorganism associated with dental caries. This activity supports the traditional use of guava leaves in oral hygiene and highlights their potential application in herbal oral-care preparations.
- **Spermatoprotective Activity:** Leaf extracts of *P. guajava* have been reported to exert beneficial effects on sperm production and sperm quality in experimental studies. These findings suggest possible spermatoprotective properties; however, further clinical investigations are required to establish their therapeutic relevance in male infertility.
- **Antimutagenic Activity:** Aqueous extracts of *P. guajava* have demonstrated antimutagenic activity by reducing or inactivating the mutagenic effects of certain direct-acting mutagens. This activity may be associated with the antioxidant and phytochemical constituents present in the plant.
- **Cardiovascular Activity:** Experimental investigations have indicated that *P. guajava* leaf extracts may influence myocardial contractility and produce a depressant effect on myocardial inotropism. Such findings suggest that guava possesses potential cardiovascular activity, although further studies are necessary to clarify its mechanism and therapeutic significance.
- **Spasmolytic Activity:** The spasmolytic activity of guava leaf preparations has been associated primarily with quercetin and related flavonoid constituents. These compounds may

contribute to the relaxation of smooth muscle and may explain the traditional use of guava preparations for certain gastrointestinal disorders.

- **Activity Against Rotaviral Enteritis:** *P. guajava* preparations have been investigated for their potential therapeutic effects against infantile rotaviral enteritis. Experimental findings have indicated beneficial effects, suggesting that guava may possess antiviral and gastrointestinal protective properties.
- **Anticancer Activity:** Aqueous extracts prepared from the budding leaves of *P. guajava* have demonstrated anticancer potential in experimental prostate cancer models. In a xenograft mouse model, treatment with the extract was associated with reductions in serum prostate-specific antigen levels and tumour size. These findings indicate promising anticancer activity, although further preclinical and clinical studies are necessary.
- **Antifungal Activity:** Hot-water and methanolic extracts of *P. guajava* have shown antifungal activity against selected fungal strains, including *Arthrrium sacchari* and *Chaetomium funicola*. This activity further supports the broad antimicrobial potential of guava phytoconstituents.
- **Analgesic and Anti-inflammatory Activity:** Aqueous leaf extracts of *P. guajava* have demonstrated analgesic and anti-inflammatory effects in experimental studies. Different solvent extracts, including hexane, ethyl acetate, and methanol extracts, have also shown dose-dependent antinociceptive effects in chemical and thermal models of pain. These effects may be related to the flavonoids and other phenolic constituents present in the leaves.
- **Oral Healthcare Activity:** The traditional use of *P. guajava* in oral healthcare has been documented in several communities. In southern Nigeria, young twigs are traditionally used as chewing sticks for maintaining oral hygiene. The presence of bioactive constituents such as tannins, flavonoids, saponins, and alkaloids may contribute to their antimicrobial and antiplaque effects. The reported activity against oral microorganisms, particularly *S. mutans*, supports the potential use of guava leaf and twig preparations in the development of herbal oral-care products such as mouthwashes and toothpastes.

CONCLUSION

Psidium guajava L. is a medicinally important plant that has attracted considerable scientific interest because of its extensive traditional use and diverse pharmacological properties. The leaves are particularly rich in bioactive constituents such as flavonoids, tannins, phenolic acids, and other polyphenolic compounds, which are associated with antioxidant, antimicrobial, anti-inflammatory, antidiabetic, antidiarrheal, hepatoprotective, anticancer,

wound-healing, and oral health-promoting activities. Available experimental evidence supports the traditional application of guava leaves in the management of various oral conditions, including dental plaque, gingivitis, oral infections, and mouth ulcers.

The presence of multiple biologically active phytoconstituents and the demonstrated pharmacological activities indicate that *P. guajava* leaves represent a promising natural resource for the development of herbal therapeutic and oral healthcare preparations, particularly herbal mouthwashes. Nevertheless, the available evidence is predominantly based on preclinical and experimental studies, and important limitations remain regarding extract standardization, dosage optimization, long-term safety, bioavailability, and clinical efficacy. Therefore, well-designed clinical trials, systematic toxicity studies, and standardized approaches for the preparation and evaluation of guava leaf extracts are required to establish their therapeutic value and ensure consistent quality. Overall, the existing literature highlights the considerable pharmaceutical potential of *P. guajava* and supports further research into its application in evidence-based herbal medicines and oral healthcare products.

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