Acta Scientific PAEDIATRICS (ISSN: 2581-883X)

Volume 8 Issue 7 July 2025

Review Article

Review On: *Psidium guajava*

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Received: April 29, 2025

Published: June 23, 2025

Abstract

Psidium guajava L is a medicinal plant having multiple source of drug and uses. From this plant various drugs were derived directly or indirectly from them. The drugs obtained from this are used to treat or evaluate anti-inflammatory, antimicrobial, antihelmentic, antimitotic and antidiabetic effects. In this all parts of plant posses any type of medicinal property.

Phytochemical screening of *Psidium guajava* leaves show presence of phenolic compounds, carbohydrates, flavonoids, carotenoids, terpenoids, and triterpenes in ethanolic extract of leaves of *Psidium guajava* L. The review shows the overall outline of the medicinal properties and mechanism of action on various activity and chemical compounds of *Psidium guajava* L and further use for investigation for the development of effective compound.

Keywords: *Psidium guajava*; Carotenoids; Dutch; Anti-proliferative

Introduction

Guava (*Psidium guajava*), an evergreen tree of the Myrtaceae family, is a vital food crop and medicinal plant native to South America, widely cultivated in tropical and subtropical regions, including India. Its fruits are rich in phenolic compounds, flavonoids, carotenoids, terpenoids, and triterpenes. These bioactive compounds contribute to its pharmacological properties such as antioxidant, antidiabetic, anti-inflammatory, antimicrobial, and anticancer activities. Guava leaves and fruits are particularly valued in traditional medicine for treating gastrointestinal issues, diabetes, hypertension, and menstrual pain. Additionally guava supports immune health and heart function due to its high vitamin C content and fiber [1].

Guava (*Psidium guajava*) leaves and bark have been used medicinally for centuries. In India, their decoction treats diarrhea, dysentery, vomiting, sore throats, and regulates menstrual cycles. Amazonian tribes use it for mouth sores, bleeding gums, vaginal discharge, and postpartum vaginal toning. Guava is cultivated globally in tropical regions.

Consumed raw or processed into jams, jellies, and juices. Rich in fiber, potassium, and vitamin A, guavas are fat- and cholesterol-free. Additionally, guava leaves exhibit antimicrobial, antioxidant, anti-inflammatory, and antidiabetic properties. They are officially recognized in the Dutch Pharmacopoeia for their medicinal benefits [2].

Scientific investigations since the 1940s validate guava's medicinal properties, with *in vitro*, *in vivo*, and clinical trials demonstrating efficacy against infectious diseases (diarrhea, dental caries) and noncommunicable conditions (diabetes, hypertension). Phenolic compounds in leaves exhibit anti-inflammatory, antimicrobial, and antidiabetic effects, while fruit extracts show antioxidant and anticancer potential. Commercial applications include guava tea and supplements.

Figure 1: *Psidium guajava* L.

Taxonomy

Table 1: Scientific classification of *Psidium guajava* [4].

Kingdom	Plantae
Phylum	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Myrtales
Family	Myrtaceae
Genus	*Psidium*
Species	*Psidium guajava*

Geographic distribution

Guava (*Psidium guajava*) originated in tropical America, specifically Mexico, Central America, and northern South America. It has spread globally, thriving in tropical regions like Brazil, India, China, Indonesia, Nigeria, and Thailand. and it is growing majorly in some regions of India like Bihar, Chhatisgarh, Madhya Pradesh, Odisha, Uttar Pradesh, West Bengal, Maharashtra. The highest production of *P. guajava* in Andhra Pradesh, Panjab, Assam, Madhya Pradesh, Utter Pradesh, Uttarakhand [5].

Morphological character

Psidium guajava (guava) is an evergreen shrub or tree growing 6–25 feet tall with square, downy twigs and wide-spreading branches. Its twisted branches produce opposite leaves, while its fragrant flowers have four to six white petals with golden anthers. The fruit is round, ovoid, or pear-shaped, measuring 4–10 cm in diameter and weighing 100–400 g. It ripens to reddish-yellow and contains numerous seeds embedded in sweet or slightly acidic pulp. Guava belongs to the Myrtaceae family and thrives in tropical and subtropical regions worldwide, valued for its nutritional richness and economic importance in food and medicinal applications [6].

Chemical constituent

In the *Psidium guajava* the several chemical constituents are present in each and every part of plant. But leaves of guava is the rich source of the phytoconstituents, Nutritional composition, Polysaccharides, Fatty acid [12].

Quercetin, avicularin, apigenin, guaijaverin, kaempferol, hyperin, myricetin [13], Gallic acid, catechin, epicatechin, quercetin, chlorogenic acid, epigallocatechin gallate, caffeic acid [14], Proanthocyanidins (PAs) [15], Gallic acid, chlorogenic acid, epicatechin, mono-3-hydroxyethyl- quercetin glucuronide, rutin, isoquercitrin, quercetin-3-O--L-arabinofuranoside, quercetin-3- O--D-xylopyranoside, avicularin, quercitrin, kaempferol-3-arabofuranoside, quercetin, kaempferol.

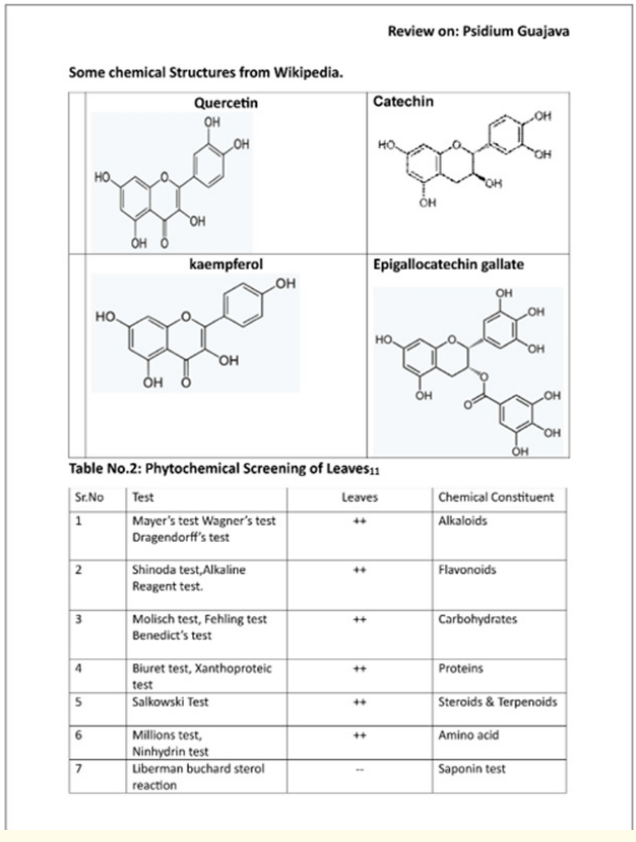

Table No.2: Phytochemical Screening of Leaves[11]

Sr.No	Test	Leaves	Chemical Constituent
1	Mayer's test Wagner's test Dragendorff's test	++	Alkaloids
2	Shinoda test,Alkaline Reagent test.	++	Flavonoids
3	Molisch test, Fehling test Benedict's test	++	Carbohydrates
4	Biuret test, Xanthoproteic test	++	Proteins
5	Salkowski Test	++	Steroids & Terpenoids
6	Millions test, Ninhydrin test	++	Amino acid
7	Liberman buchard sterol reaction	--	Saponin test

Figure 2

Activity	Mechanism of action
Anti-cancer	α-T inhibits NF-κB signaling, a pathway where the transcription factor NF-κB regulates gene expression critical for immunity, inflammation, cell survival, and stress responses by activating target protein complexes.
Anti-bronchitis	TRAF2 activates NF-κB via NIK and MAPKs, leading to IκB degradation. IKK2 inhibition prevents NF-κB activation, reducing inflammation and slowing COPD progression by targeting pro-inflammatory pathways
Anti-inflammatory	β-Caryophyllene (BCP) inhibits iNOS, reducing NO production and inflammation. This modulates RNOS and ROS, impacting mitochondrial respiration, DNA synthesis, vascular relaxation, and cellular signaling pathways
Anti-diabetic	Rutin enhances glucose uptake by activating the insulin signaling pathway, promoting GLUT4 translocation. Insulin binds to the α-subunit of its receptor, stimulating tyrosine phosphorylation of the β-subunit via ATP. This activates intracellular signaling for glucose metabolism without altering catalytic velocity, mimicking insulin's effects.
Anti-tumor	Oleanolic acid (OA) exhibits anti-cancer effects by inducing apoptosis via p53 and mitochondrial pathways, modulating microRNA-122, inhibiting metastasis, and enhancing drug efficacy across cancer types.
Anti-bacterial	Quercetin combats bacteria by disrupting cell walls, altering membrane permeability, inhibiting enzymes, blocking nucleic acid synthesis, and synergistically enhancing antibiotics' efficacy through biofilm disruption and drug penetration
Anti-proliferative	Flavonoids modulate cell signaling by inhibiting or stimulating kinases like Akt, MAPK, and PKC, altering phosphorylation, gene expression, and cellular functions to suppress proliferation

Table 2: Medicinal activity of *p. guajava* with mechanism of action [6].

Part of plant	Compound	Uses	Reference
Leaves	Flavonols (quercetin, kaemp ferol), gallic acid, ellagic derivatives, cyanidin-glucoside	Antihyperglycemic, Antihyperlipidemic, Anti diabetic activity, Analgesic activity, Anticancer, Antihelmentic.	[7,8]
Pulp	Ascorbic acid, Carotecoids (Lycopene, β-carotene, β-cryptoxanthin)	Antioxidant, anti-hyperglycemic, Anti- neoplastic activity.	[7]
Seed	Glycosids, Carotenoids, phenolic compounds, stigmasterol, campesterol.	Antimicrobial, Antiulcer, Antispasmodic, Antihypertension, Antiinflammatory.	[7,9,10]
Skin	Phenolic compounds	Endothelial progenitor cells and improvement of their intestinal absorption	[7]
Bark	Phenolic compounds	Antibacterial activity.	[7]

Table 3: Application of *P. guajava* by parts of plant.

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