

Ayurvedic Medicinal Use of *Psidium guajava* L. in the Management of Different Disorders

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ABSTRACT

Psidium guajava L. (commonly known as guava) is a tropical fruit-bearing tree, which is renowned for its numerous medicinal properties. Ayurvedic medicine, a traditional system of healing that emphasizes balance and harmony within the body, has recognized the value of *Psidium guajava* L. In various therapeutic applications. The fruit, leaves, bark, and seeds of the guava tree have been used to treat a wide range of ailments, owing to their diverse pharmacological activities. The primary medicinal actions of *Psidium guajava* L. Are attributed to its rich phytochemical composition, including alkaloids, flavonoids, tannins, essential oils, and vitamins. In Ayurveda, the plant is considered to possess properties like deepan (appetizer), pachana (digestive), stambhana (astringent), raktashodhana (blood purifier), kaphahara (anti-cough), and vata-pitta balancing. Guava is used to treat gastrointestinal disorders, respiratory issues, skin conditions, and even diabetes. Gastrointestinal Health, Respiratory Benefits, Antioxidant and Anti-inflammatory Properties, Rich in antioxidants, Skin and Wound Healing, Diabetes Management, Mental and Neurological Health. In conclusion, *Psidium guajava* L. Is a multifaceted plant with wide-ranging medicinal applications in Ayurvedic medicine. Its therapeutic uses, supported by modern pharmacological research, make it an essential component in both traditional and contemporary health practices. Further scientific studies are warranted to validate and expand upon its various health benefits, ensuring safe and effective use in medicinal formulations.

Keywords- *Psidium guajava* L., Diabetes Management, Antioxidant, Anti-inflammatory.

I. INTRODUCTION

Since ancient times, medicinal plants are identified as valuable sources of therapeutic agents. Among these, *Psidium guajava* L. (guava), belonging to the family Myrtaceae, holds particular importance because of its rich phytochemical profile and wide range of pharmacological activities. Guava is widely distributed in tropical and subtropical regions and is commonly employed in traditional systems of medicine for the management of diarrhoea, wounds, diabetes, microbial infections, and inflammatory disorders. These therapeutic effects are largely attributed to the presence of phenolic acids, flavonoids, tannins, terpenoids, and carotenoids, which demonstrate antioxidant, antibacterial, and anti-inflammatory properties [1][2][3][4].

Antioxidants present in guava leaves are of special significance since they act against free radicals and thereby reduce the risk of chronic illnesses, including cancer, cardiovascular disease, and neurodegenerative conditions [5][6]. Extracts derived from guava leaves, prepared with solvents such as water, ethanol, methanol, or hydroethanolic mixtures, exhibit notable biological activities, with the 50% hydroethanolic extract in particular yielding a higher phenolic content and stronger antioxidant potential [7][8]. The medicinal value of guava leaf extracts also supports their application in pharmaceutical formulations, especially topical ointments intended for wound healing and anti-inflammatory purposes [9].

In recent years, growing interest is directed toward incorporating guava leaf extracts into pharmaceutical preparations. Ointments, being semi-solid

topical formulations, are especially suitable for the inclusion of such herbal extracts because they ensure prolonged skin contact, localized therapeutic action, and a safer profile compared with many synthetic agents [7].

This review therefore provides an overview of the plant's botanical aspects, extraction techniques, phytoconstituents, pharmacological properties, and its role in the development of herbal ointments.

Botanical Overview

- Scientific name: *Psidium guajava* L.
- Family: Myrtaceae
- Morphology:
 - Leaves: Simple, aromatic, 5–15 cm long, with prominent venation and fine hairs on the underside.
 - Flowers: White, fragrant, approximately 2–3 cm in diameter.
 - Fruits: Rounded or pear-shaped berries with green to yellow skin and white, pink, or red pulp.
- Root system: Shallow and fibrous, adapted to tropical soils; decoctions of roots are traditionally employed to alleviate dental pain and digestive complaints [8].



Fig.1 *Psidium guajava* L.

II. VARIOUS PARTS OF *PSIDIUM GUAJAVA* L. AND THEIR USES

- Leaves: Rich in flavonoids and tannins, traditionally used for gastrointestinal disorders, wound healing, diabetes management, and microbial infections. Their antioxidant and anti-inflammatory properties further enhance their medicinal applications.
- Fruits: Nutritious and abundant in vitamin C, carotenoids, and dietary fiber, contributing to immunity enhancement and digestive health.
- Roots and Bark: Commonly utilized in folk medicine for toothaches and intestinal problems.

- Seeds: A source of oils with antioxidant and lipid-lowering activities [9].

Active Constituents of *Psidium guajava* L.

Guava leaves contain a wide spectrum of bioactive compounds responsible for their therapeutic efficacy:

- Phenolic compounds: Gallic acid, caffeic acid, chlorogenic acid – potent antioxidants.
- Flavonoids: Quercetin, guaijaverin, rutin, catechin, epicatechin – anti-inflammatory, antimicrobial, and antidiabetic.
- Triterpenes: Betulinic acid, oleanolic acid – anticancer, hepatoprotective, and anti-inflammatory.
- Carotenoids: Lycopene, β -carotene – antioxidant and cardioprotective.
- Tannins & Saponins: Provide astringent, antimicrobial, and wound-healing effects.
- Other compounds: Essential oils, vitamins (C, A), and minerals [1][2][3][4].

III. PHARMACOLOGICAL ACTIVITIES OF DIFFERENT PLANT PARTS OF *PSIDIUM GUAJAVA* L.

Leaves

Guava leaves are particularly rich in flavonoids such as quercetin and guaijaverin, which account for their strong antidiarrheal, antispasmodic, antibacterial, and anti-inflammatory activities. Extracts prepared with water, ethanol, or methanol show significant antimicrobial effects against *Staphylococcus aureus*, *Salmonella*, *Shigella*, *E. Coli*, and *Pseudomonas* [10]. Additionally, guava leaf extracts demonstrate antiviral activity against influenza viruses and aquatic viral pathogens. Their antioxidant potential, due to polyphenols and tannins, supports traditional use in respiratory ailments such as cough, bronchitis, and asthma [11].

Extraction Process of Guava Leaves
Fresh leaves are shade- or air-dried, powdered, and packed into a Soxhlet thimble (10–20 g). Extraction is carried out with ethanol, methanol, or hydroethanol (~150–250 ml) at 60–65 °C for 4–5 hours, until the solvent becomes clear. The extract is concentrated using a rotary evaporator at 50–60 °C, dried, and preserved in airtight containers at –18 °C [11][12]. Soxhlet extraction with methanol yields higher concentrations of phenolic compounds (up to 44 mg/g) compared to maceration or ultrasound methods, while hydroethanolic solvents, particularly 50% mixtures, provide the highest antioxidant efficacy [10][12].

Fruits

Guava fruits are an excellent source of vitamins (A, C, and E), carotenoids, and dietary fiber, which contribute to antioxidant, anticancer, and

immunomodulatory effects. Phytochemicals such as gallic acid, kaempferol, and cyanidin-3-glucoside are abundant in the pulp, seeds, and peel, imparting strong antioxidant and antimicrobial activity. Essential oils derived from fruits, particularly rich in β -caryophyllene and limonene, exhibit anti-inflammatory, radical scavenging, and cytotoxic activities [13].

Extraction Process of Guava Fruits
Conventional hot water extraction (HWE) is performed by washing, peeling, and deseeding guava fruits before homogenizing the pulp. The material is extracted with water (1:1–3:1, pH ~4.5) under reflux at ~90 °C for 1–2 hours. The extract is cooled, centrifuged, and polysaccharides/pectins are precipitated with ethanol or acetone, dried below 50 °C, and stored [14].

Bark

Guava bark contains tannins, sterols, and polyphenolic compounds. It is traditionally used as an astringent and wound-healing agent [15]. Scientific investigations confirm its antimicrobial and antidiabetic properties [15][16].

Extraction Process of Guava Bark
Shade-dried bark undergoes ethanol maceration to yield crude extracts, while aqueous Soxhlet extraction produces an 11.03% w/w water-soluble fraction [16]. Successive Soxhlet extraction with solvents of increasing polarity (petroleum ether to methanol) provides fractions enriched in tannins, alkaloids, flavonoids, saponins, and steroids, many of which show significant bioactivity [15].

Roots

Roots of *P. Guajava* contain tannins, sterols, gallic acid, and carbohydrates. They are used traditionally to treat gastrointestinal disorders and show antimicrobial and anti-inflammatory activity, though research on them remains limited compared to leaves and fruits [17][18].

IV. EXTRACTION PROCESS OF GUAVA ROOTS

Roots are washed, shade-dried, and ground to fine powder. Five grams of powder is sequentially extracted with methanol followed by water (30 ml each). Extracts are concentrated on a rotary evaporator at 30–40 °C, and dried residues are reconstituted in the respective solvent and stored at 4 °C for analysis [18].

Seeds

Guava seeds are a rich source of phenolic compounds and antioxidants, often exceeding the pulp in concentration. These bioactive constituents are associated with anticancer, antimicrobial, and free radical scavenging effects, highlighting their potential in nutraceutical development [19].

Extraction Process of Guava Seeds
Soxhlet extraction is conducted with ethanol and ethyl acetate as solvents. Thirty grams of powdered seed material is extracted with 250 ml solvent for 10 hours under continuous reflux. The solvent is evaporated at 40

°C and the dried extracts are reconstituted for further use [19–20].

Flowers

Although less studied, guava flowers contain volatile oils and phenolic constituents that contribute to antioxidant and antimicrobial properties, adding to the plant's therapeutic diversity [21–24].

Extraction Process of Guava Flowers
The essential oil from guava flowers is obtained by hydrodistillation using a Clevenger-type apparatus. Fresh flowers are divided into three 100 g samples; each distilled with 500 ml of distilled water for 3 hours. The oil is collected, dried with anhydrous sodium sulfate, filtered, and stored in amber bottles at 4 °C [25–29]. The procedure is performed in triplicate, and yield is calculated based on fresh flower weight and expressed as the mean value [30].

V. CONCLUSION

Psidium guajava L. (guava), widely distributed across tropical and subtropical regions, is recognized as a valuable medicinal plant due to its diverse phytochemicals and broad therapeutic potential. Various plant parts—including leaves, fruits, bark, roots, seeds, and flowers—exhibit significant biological activities such as antioxidant, antimicrobial, anti-inflammatory, antidiabetic, and wound-healing effects. Among these, the leaves are particularly noteworthy for their abundance of flavonoids and tannins, with hydroethanolic extracts showing especially strong antioxidant and healing properties. Its adaptability to different habitats ensures a steady supply, supporting its use in both traditional remedies and modern pharmaceutical preparations, such as topical ointments for skin and wound treatment. However, further clinical research and standardized extraction protocols are essential to confirm its safety and enhance its reliable integration into healthcare practices [31–37].

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